The Dissertation Committee for Josh Craig Rainey certifies that this is the approved version of the following dissertation:

The Relation of Depression, Health Related Quality of Life, and Parenting Stress in Overweight and Obese Children

Committee:

_____
Timothy Keith, Supervisor

_____
Jane Gray, Co-Supervisor

_____
Stephen Pont

_____
Deborah Tharinger

_____
Nancy Daley

_____
David Drum

The Relation of Depression, Health Related Quality of Life, and Parenting Stress in Overweight and Obese Children

by

Josh Craig Rainey, B.A.; M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

August, 2014

DEDICATION

This dissertation is dedicated to my grandparents, whose love for life inspires me every day.

ACKNOWLEDGEMENTS

I give thanks to my family for showing me by example of how to be strong, take pride in my work, and how to push myself to accomplish tasks I never thought possible. Their unconditional love and care has aided me both in good times and times of hardship. It is impossible for me to express how much they have meant to me.

I would like to acknowledge my mentors from Drury University as well as those from the University of Texas. They have given me so many incredible opportunities to learn and experience psychology as well as helping me grow as a student, clinician, and as a person. In particular, I would like to thank Dr. Cawthon, Dr. Tharinger, and Dr. Daley for investing in my professional and personal development. I would like to thank Dr. Gray for her supervision of research and clinical work, my development as a clinician is in a large part due to her. I am also thankful for Dr. Keith for guiding my research and for having an open door to my excessive statistical inquiries. Without these mentors I would not be where I am today.

I would like to give a huge thank you to all of my friends and co-workers for making me laugh and standing by me. Specifically, I would like to thank Gina Smuts for her constant care in work and friendship. Another thank you to Elizabeth Walsh and Sarah Gojer for pouring through data entry with me, I couldn't have finished without them. Finally, I would like to thank my dog Snoods, he has spent the most hours working side by side with me, always with a smile.

The Relation of Depression, Health Related Quality of Life, and Parenting Stress in Overweight and Obese Children

Josh Craig Rainey, Ph.D.

The University of Texas at Austin, 2013

Supervisors: Timothy Keith and Jane Gray

Obesity can have far reaching negative effects on a child or adolescent's health and quality of life. Child and adolescent obesity has a strong correlation with health-related quality of life (HRQOL), an indicator of an individual's total wellbeing, including physical, emotional, and social aspects of that individual's life. HRQOL can be negatively affected by obesity across several domains, including physical comfort, body esteem, social life, family relations, emotional well-being, and general quality of life (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008). Another area of concern for this population is that parental stress is much higher in parents with children and adolescents who are overweight or obese (Chiou & Hsieh, 2008; Streisand et al., 2003). This relationship is shown to compromise children's psychological well-being and hinder treatment (Cushner-Weinstein et al., 2008; Mullins et al., 2007; Ohleyer et al., 2007).

The purpose of the current study was to expand previous research by examining the relations between depression, HRQOL, and parental stress. The study also explored how gender and BMI affect the relationship between depression and HRQOL. Participants included children 5-13 years of age and their parents living in the Central Texas area. The children were identified by their pediatrician as being overweight or obese.

Results for the main analyses provided several significant findings. First, results demonstrated that the relation between depressive symptoms and child reported HRQOL was significant. Specifically, depressive domains of interpersonal problems, anhedonia, and negative self-esteem were all significant and negatively related to the child's report of HRQOL. Likewise, the HRQOL domains of physicality, teasing/marginalization, and social avoidance were both significantly and negatively related to depressive symptoms. There was no significant relation between depression and parent's perception of HRQOL or any of their specific domains. Furthermore, the results indicate that there were no significant gender differences and that higher BMI was not associated with an increased relation between child reported HRQOL and depressive symptoms. Finally, parental stress was significantly and negatively related to child and parent reported HRQOL. Implications, limitations, and areas of future research are discussed.

Table of Contents

Chapter I: Introduction

In recent decades, child and adolescent obesity has increased in prevalence. Over the past three decades, rates of child and adolescent obesity have tripled (Sarwer & Dilks, 2011). Around 30% of children and adolescents are overweight (BMI > 85th percentile), 17% are obese (BMI >95th percentile) (Herzer et al., 2011) and 4% are extremely obese (BMI >99th percentile) (Modi et al., 2008).

Obesity can have far reaching negative effects on a child or adolescent's health and quality of life. Obese adolescents commonly have additional medical problems, including high cholesterol, elevated blood pressure, or Type II diabetes (Nadeau et al., 2011). Children and adolescents with obesity have behavioral and emotional problems and diagnoses, particularly depression, at a higher rate than that of children and adolescents without obesity (Goodman & Whitaker, 2002). This relationship may be cyclical, because obesity may have an influence on emotional and behavioral symptoms and emotional and behavioral symptoms may also have an influence on obesity. Common psychological problems of obesity are internalizing and externalizing factors such as attention-deficit hyperactivity disorder, impulsivity, anxiety, and depression (Puder, 2010; Boutelle et al., 2010). Depression specifically has been shown to put children at risk for obesity in adolescence and early adulthood (Goodman & Whitaker, 2002). Depression and obesity are particularly linked for girls, as the comorbidity rates increase in the female gender (Anderson et al., 2006; Blaine, 2008; Hillman et al., 2010). Child and adolescent obesity has a strong correlation with health-related quality of life (HRQOL), an indicator of an individual's total wellbeing, including physical, emotional, and social aspects of that individual's life. Perhaps as a result of these medical and psychological issues, HRQOL can be negatively

affected by obesity across several domains, including physical comfort, body esteem, social life, family relations, emotional well-being, and general quality of life (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008).

Changing a patient's health is a priority among those implementing interventions; therefore, it is important to measure physical, behavioral, and emotional outcomes reliably. Given the vast array of obesity based depressive symptoms and interventions there are also many ways to collect outcome data both medically and behaviorally. Since depression is among the most prevalent emotional problems in obese clients, self-report data are often collected to monitor symptoms across treatment. These data help to inform treatment by measuring reduction in problematic symptoms. In order to measure improvement of positive attributes, quality of life measures are often used. More specifically, HRQOL measures are often used to measure across multiple domains and track a range of positive and negative outcomes (Sajobi et al., 2012). HRQOL is an important area to continue to research since these measures are applicable for a wide variety of medical (Mond & Baune, 2009; Nadeau et al., 2011) and psycho-social treatments (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008) for obesity in adolescence. There is growing support of using HRQOL of life as an indicator of health rather than using symptom based health indicators. Symptom based indications of health offer important information on the cause of health problems; however, without higher level summarization of evaluation or overall change they are not complete (Fryback, 2010; Fryback et al., 1997; Fryback et al., 2007). In addition, HRQOL is a worthwhile treatment goal for both psychological and medical interventions.

Research and literature have helped to understand how both depression and HRQOL relate to overweight or obese children; however, one area that remains unexplored is how they relate to each other. Both depression and HRQOL are used frequently with obese children and adolescents but the link between the two constructs is not completely understood. Research has shown that strong correlations have been noted between depression and other factors such as parenting strategies, health, and emotional regulation (Puder & Munsch, 2010). Likewise, many factors have been explored as predictors of HRQOL such as body mass index, body esteem, and body image (Haraldstad et al., 2010). Since both depression and HRQOL are used as outcomes in obese clients, it was important to understand the link between them. Gender has an association with depression, as obese girls experience greater rates of depression starting in adolescence than boys (Goodman & Whitaker, 2002; Anderson et al., 2006), and was an important area to explore as a link between depression and HRQOL. BMI has been associated with both HRQOL (Haraldstad et al., 2010) and depression (McCabe & Ricciardelli, 2003) which indicated that it was a good factor to examine in more detail. Likewise, parenting stress has been related to both depression and HRQOL (Tan & Rey, 2005; Guilfoyle et al., 2010) and was an area suitable to examine as a link between the two constructs.

Researching the correlations between depression and HRQOL should be valuable as a tool to understand both constructs and how they relate to each other in an overweight or obese youth population and by informing researchers and clinicians on how treatment affects the constructs. Depression and HRQOL are multi-dimensional in nature, allowing for correlations across specific domains. Learning the relationship between depression and HRQOL will help to determine if specific domains are predictive or protective of others and could result in a clearer

understanding of how depression and HRQOL are perceived by children and adolescents who are overweight or obese.

In order to gather the clearest information possible about these constructs, it is important to choose measures that best represent the child and adolescent overweight or obese population's outcome goals. In general, these are measures that can detect negative symptoms as well as positive attributes (Puder & Munsch, 2010; Modi et al., 2008). However, in order to use best practices and meet site specific needs, a more rigorous evaluation of the measures was done. A strong reliability and validity assessment was completed to create a proper standard of research. To meet the needs of the site specific sample and to capture the unique perspective of the parents with parent forms when possible, only measures that were validated in English and Spanish were considered.

The Children's Depression Inventory (CDI) met the criteria listed above for the depression measure. The CDI are DSM oriented self-report measures that have major domains in negative mood, ineffectiveness, negative self-esteem, anhedonia, and interpersonal problems. Practical application of the CDI is across multiple settings including mental health clinics and medical settings. It has also been validated for both Spanish and English, making this an ideal behavioral measure for this study (Kovacs, 1982).

The Sizing Them Up and Sizing Me Up (STU and SMU) also met the criteria listed above for the HRQOL measure. The STU and SMU are obesity specific HRQOL self-report measures that have major domains in emotional functioning, physical functioning, social avoidance, positive social attributes, and teasing/marginalization. Practical application of the STU and SMU is across multiple settings including mental health clinics and medical settings.

They have also been validated for both Spanish and English, making them ideal HRQOL measures for the study (Zeller & Modi, 2009).

The Parenting Stress Index (PSI) also met the criteria for an appropriate measure in this study. The PSI is a self-report measure that is designed to measure the stress that is related to parenting. It measures major domains of parental distress, parent-child dysfunctional interaction, and difficult child. Practical application of the PSI is across multiple settings including mental health clinics and medical settings. It is designed to measure parental stress for children aged one month to twelve years. It has also been validated for both Spanish and English, making this an ideal measure for the study (Abidin, 1990; Haskett et al., 2006).

Body mass index (BMI) was also well suited for this study. It is a calculation designed to categorize weight related health by using the participant's height and weight (CDC, 2011). BMI is simple to calculate, gives more information than weight alone, is one of the most commonly used weight descriptions, and is highly correlated with co-morbidities including depression and HRQOL. (Forbes & Halloran, 1976; Reddy, 1991; Haraldstad et al., 2010; McCabe & Ricciardelli, 2003)

There is ample research in the area to determine that physical and psychological problems often occur in children and adolescents with obesity. Despite many successful treatments of obesity, the statistics generally show that obesity among children and adolescents continues to be on the rise. The increased rates and severity of problems indicate that child and adolescent obesity is an ideal area for continued research. This study was designed to inform research and treatment of obesity by improving what we know about depression and HRQOL with measurable data. Two well-known measures, the CDI and STU/SMU, were been used in

this process. The study also tested if there were gender differences in the relationship between depression and HRQOL. This study sought to inform how BMI affects the relationship between depression and HRQOL. The relationship between depression and HRQOL was also be determined when BMI is controlled in order to determine what affect it has on the relationship between these two variables. Lastly, this study determined what role parenting stress has in predicting depression and HRQOL.

The primary purpose of this study was to investigate the properties and associations of both depression and HRQOL when they are used in a population of children and adolescents who are overweight or obese. This study explored how these two constructs relate to each other, as there is no previous research determining their relationship. Specifically, this study examined the associations between depression and HRQOL by correlating total scores of the CDI and the STU/SMU scale. Likewise, specific domains of depression were correlated with HRQOL and specific domains of HRQOL will be correlated with depression. It was expected that all the problem domains of depression will be negatively correlated with the HRQOL. It was also expected that all the domains of HRQOL will be negatively correlated with depression. This was done because it is possible that children could deny psychiatric symptoms and still have poor quality of life and vice versa. This helped to identify any specific relationship between depression and HRQOL. Examining these associations could indicate the importance of considering both HRQOL and depression for children and adolescents with obesity.

Secondarily, the study examined the differences between genders on both depression and HRQOL. This helped to solidify current research on gender and depression as well as to explore the possibility of gender differences on HRQOL. This secondary analysis also helped

researchers and clinicians to better understand this population and inform their future research, measurement, and interventions.

Next, the study will examined how BMI affects the relationship between depression and HRQOL. BMI has been shown to have a relationship with both depression and HRQOL (Haraldstad et al., 2010; McCabe & Ricciardelli, 2003), and this study helped to replicate these findings. Furthermore, this study was used to determine how BMI interacts with the relationship between depression and HRQOL by examining the correlation of depression and HRQOL when controlling for BMI. This gave new information to clinicians and researchers in order to better understand how BMI is related to depression and HRQOL as well as informed future research, measurement, and interventions.

Last, this study examined how parenting stress may affect depression and HRQOL. Parenting stress has been shown to be a predictor of depression in children (Tan & Rey, 2005). Parenting stress has also been shown to predict parent reported HRQOL but not child reported HRQOL (Guilfoyle et al., 2010). This study was used to help replicate the findings of these studies. Furthermore, this study sought to compare the magnitude of effects between the variables predicted by parenting stress. This finding should help in understanding how much parenting stress affects depression and HRQOL. The new information may help clinicians and researchers better understand how parenting stress is related to both depression and HRQOL and will inform future research, measurement, and interventions.

Overall, this study was designed to to find how depression and HRQOL are related and to what extent they are related in the overweight and obese children and adolescent population, a relationship that has previously not been studied. The study also helped to differentiate the two

constructs by finding what differences there are when gender, BMI, and parenting stress are analyzed regarding the relationship between depression and HRQOL.

Chapter II: Literature Review

Overweight and Obesity Rates

Obesity has reached epidemic proportions for children and adolescents in America and rates continue to increase with no indication of decreasing in the near future (Seidell, 2008; Kopelman et al., 2008). Over the past 30 years the prevalence of overweight or obese children and adolescents has tripled (Sarwer & Dilks, 2011). That increase has led to large numbers of children and adolescents being categorized as overweight or obese; specifically, around 30% of children and adolescents are overweight (BMI>85th percentile) and 17% are obese (BMI>95th percentile) (Herzer et al., 2011). As weight increases past the point of obesity, 4% of children and adolescents are morbidly obese (BMI>99th percentile) (Modi et al., 2008). These rates are not expected to decrease and without successful implementation of large scale treatment are expected to continue to increase (Seidell, 2008; Kopelman et al., 2008).

With childhood and adolescent rates of overweight and obesity reaching nearly one third of the population, a high impact on society can be seen. Obesity has negative consequences for both physical and mental health. It is associated with a myriad of physical health consequences including but not limited to Type II diabetes, obstructive sleep apnea, and nonalcoholic fatty liver disease, as well as social emotional issues including depression, social isolation, and poor self-image (Davison & Birch, 2001; Must & Strauss, 1999). There is little evidence to suggest that the epidemic is nearing its end and is only expected to increase in prevalence (Mitchell et al., 2011). The Surgeon General projected the estimated costs for 2040 associated with obesity will be almost 40 billion (U.S. Department of Health and Human Services, 2001). Thus, there are important reasons to enhance our understanding of pediatric obesity.

Measurement of Body Weight

As rates of overweight and obese children increase, it is important to consider how weight categories are measured in order to determine exactly what it means to be overweight or obese. Weight alone is not an accurate measure of being overweight or obese, as children have varying body types and body weight fluctuates on a daily basis (Jebb & Wells, 2008; Kopelman et al., 2008). For these reasons, the body mass index (BMI) was created. BMI uses a simple formula that takes into account both height and weight, in order to help normalize various body types. This formula creates a more meaningful metric in which to gauge weight categories. The formula is weight over height squared [$\frac{\text{weight}}{\text{height}^2}$] (Hu et al., 2012).

Although the ranges of BMI in weight categories vary across ages in childhood, some general weight categories can be made using percentiles. These percentile ranges are as follows:

- 1^{st} to 5^{th} Underweight
- 5^{th} to 85^{th} Healthy Weight
- 85^{th} to 95^{th} Overweight
- 95^{th} to 99^{th} Obese
- $>99^{th}$ Morbidly Obese

These general ranges are used commonly to describe the weight status of children (CDC, 2011).

The benefits to using BMI in determining weight categories is that it is simple to calculate, it gives more meaning to use a weight category than to use weight alone, it is a commonly used metric, and it is highly correlated to comorbidities in health problems (Forbes & Halloran, 1976; Reddy, 1991). Even with these many benefits, it is not without its limitations. It

is not a completely accurate judge of health since there are many-factors that contribute to BMI other than simple nutritional status. One of the foremost factors contributing to BMI is body shape, in particular the ratio between leg length and trunk length. This measure of body shape varies both within populations and between populations. There are also considerable differences in body shape worldwide (Norgan, 1994; Norgan 1994b). Another problem that occurs with the use of BMI is that it does not measure adipose tissue directly. Therefore, problems occur when a person is heavy through lean muscularity instead of adipose tissue. This could result in an inaccurate weight category (Forbes & Halloran, 1976). Other forms of measuring weight categories, including mid upper arm circumference, adipose tissue measurements, and combination approaches have similar problems in accurately measuring weight categories. However, these approaches lack the simplicity and ease of measurement that BMI offers. Because of these reasons, BMI remains the most common approach to measuring weight categories (Baker et al., 1982).

Health Related Quality of Life

Health related quality of life (HRQOL) is a vital area to examine in the overweight and obese child population. Child and adolescent obesity, as measured by BMI, has a strong correlation with HRQOL, an indicator of an individual's overall wellbeing, including physical, emotional, and social aspects of that individual's life (Nadeau et al., 2011). Obesity can impact a child's quality of life across several domains, including physical comfort, body esteem, social life, family relations, emotional well-being, and general quality of life (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008; Schipper et al., 1996). Quality of life is important to

measure, because it can capture issues such as appearance-related teasing, impairment in physical activity, and deficiency in school functioning that may cause stress for the child and represent significant functional impairment (Modi & Zeller, 2009; Modi & Zeller 2008; Varni, 2001).

Quality of life can be measured in medical settings by asking about general or disease-specific HRQOL (Zeller & Modi, 2008). General HRQOL measures, such as the Peds-QL (Varni et al., 2001), can be administered to patients across disease categories, and ask general questions about functioning in relation to medical condition. These measures are useful when comparing children across disease conditions. A disease-specific measure can capture the impact of a medical condition on functioning in a more specific way. For example, an obesity-specific HRQOL measure asks directly about discomfort at mealtime, teasing related to size, and other experiences that would not be captured in a general HRQOL measure. While disease-specific HRQOL is still a relatively young area of research, there are many merits to expanding its research and use in children who are obese (Zeller & Modi, 2008).

The Impact of Obesity on the Child

Obesity and Academic Achievement

Since many people are affected by this epidemic, it is important to consider the implications of being overweight or obese. Obesity appears to have some link to poor academic achievement. Results of experiments have shown that overweight and obese participants scored significantly lower than those who were in a normal weight range on academic achievement (Sorensen, 1985; Bell-Ellison, 2009). Obesity has a relationship between many aspects of

achievement. One study shows that overweight and obese children were significantly less likely to plan to go to college, report skipping school more often, have more academic accommodations, and have lower academic grades than their peers of average weight (Fuxa & Fulkerson, 2011). Other studies suggest that overall academic scores and performance traits are lower in children with obesity than their counterparts of average weight (Gable et al., 2008). Although there are widespread negative academic consequences to children who are obese, there are signs of improvement when those children improve their health. One study shows that as children increase their exercise regimen and decrease their BMI, they began to improve their executive functioning abilities in academic tasks which further suggest that academic achievement are closely associated with obesity (Davis et al., 2011). This can be corroborated with other studies that suggest that in general exercise and nutrition in obese children have a positive correlation with academic achievement (Efrat, 2011).

Health Problems

One of the central problems with obesity is the high number of medical complications and comorbidities that are a direct result of weight. Medical problems related to being overweight or obese affect nearly all areas of the body and can range from inconveniences to severe health concerns. Since obesity affects so many areas of the body, the list of medical problems is extensive. Some of these problems include high blood pressure, high cholesterol, Type II Diabetes, acanthosis nigricans, cardiovascular disease, respiratory problems, and sleep apnea. Arguably the most extreme problem with children who are overweight or obese is the

increased risk of mortality due to these medical complications (Proietto, 2008; Pinkney, 2008; Steinbeck, 2008; Kopelman et al., 2008; Nadeau et al., 2011; Maitra & Payne, 2004).

Cardiovascular problems are among the most serious medical concerns related to obesity. Because of the link to major organs and systems, including the heart, lungs, and circulatory systems, it is important to understand the consequences of obesity on the cardiovascular system (Wilcox, 2010). Heart disease poses major risks to children with obesity and is a common comorbidity among the obese population. It should be noted that in children with obesity, those who reduce their weight to a normal range do not have a higher risk for heart disease as they age (Rocchini, 2011). Cardiovascular problems can also manifest themselves as increased risk of high blood pressure, especially in individuals who have been obese for long periods of time. Conversely, high blood pressure has been shown to decrease when individuals treat obesity and maintain a stable normal body weight, especially in children and adolescents (Matsuo et al., 2011). Cardiovascular problems related to the lungs and breathing can also be caused by obesity. Breathing problems such as asthma and sleep-disordered breathing often coincide with obesity or weight issues in children. Asthma can carry risk for extended damage to lungs and can worsen over time. However, asthma has been noted to improve when obesity has been successfully treated in children. Sleep apnea is another weight related breathing problem that can be dangerous without treatment, special equipment, or surgery. Again, findings suggest that if obesity is treated, children have high success rates in eliminating sleep apnea (Kheirandish-Gozal & Gozal, 2012; Grunstein et al., 2007). Cardiovascular problems carry serious negative consequences and obese and overweight children are at higher risk of developing these

problems; however, many studies have shown that children can overcome and repair these negative effects if obesity is treated before adulthood (Wilcox, 2010; Grunstein et al., 2007).

Endocrine problems are another set of serious medical issues that can arise from obesity; of these problems, Diabetes is one of the most frequently occurring and concerning. Type II Diabetes occurs when the body becomes resistant to insulin. There has been a significant increase in Type II Diabetes among American youth in recent years. In a recent study of a large sample of youth, 9% of obese adolescents were diagnosed with Type II Diabetes, representing a 76% increase in Type II Diabetes since 1997 (AADE, 2011). After an individual is diagnosed with Type II Diabetes, it is imperative that they monitor their glucose levels and dietary intake. Likewise, treatment is necessary in order to foster healthy outcomes; these include diet and exercise, insulin treatment, implants, and surgery. However, in some cases, extreme medical problems such as heart disease, eye complications, kidney disease, nerve damage, foot problems, skin complications, and dental disease can occur. Consistent treatment of obesity can help to avoid problems such as these, though even when obesity itself is treated, there is no cure for diabetes (AADE, 2011; NYDH, 2011; Spollett, 2012). Diabetes is not the only endocrine problem that can manifest in obese children and adolescents. Since adipose tissue secretes hormones that help regulate organ functions, individuals with poor nutrition, sedentary lifestyles or high fat accumulation are particularly at risk for developing organ problems. These problems can exist in all areas of the body and range in severity, including the possibility of death (Matsuzawa, 2010). Endocrine problems are more common among children and adolescents with obesity than those with a health weight. The medical problems they produce, as well as

their irreversibility, made them an important topic to consider relating to the health of children and adolescents with obesity.

In addition to cardiovascular and endocrine issues other health conditions can also be present in obese or overweight children and adolescents. Though, not exhaustive, this list includes sexual dysfunction (Andersen et al., 2008), weight bearing joint problems (Heo et al., 2010), gastroesophageal reflux (Kasasbeh et al., 2012), and menstrual irregularities (Wei et al., 2009). The breadth and depth of medical problems in children and adolescents who are overweight or obese makes it very important to consider. The serious nature of the medical problems associated with being overweight or obese highlight the vital nature of continuing to research the epidemic. Knowing that obesity has a relationship with a child's HRQOL (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008), HRQOL may be a good area to expand research. Health factors are one of the most urgent reasons to continue research and develop treatments of HRQOL; however, the body is not the only area damaged by being overweight or obese.

Peer Relationships

Another area of concern for children who are overweight or obese is that of peer relationships. Peer relationship problems occur in higher rates for overweight or obese children than people in a normal weight range (Steinbeck, 2008; Kopelman et al., 2008). There are two distinct areas of concern within the peer relationship construct. The first concern is that obese children may have negative relational experiences with the peers, friends, family, or romantic partners due to their limitations in physical activities. The second concern is that other people

may find obese or overweight individuals less desirable based on stigmas, stereotypes, or lifestyle differences (Kopelman et al., 2008; Puhl et al., 2008) and are often teased, marginalized, rejected, or bullied based on these traits (Neumark-Sztainer et al., 2002; Caskey & Felker, 1971). The experience of peer relationship problems within the overweight and obese population is a common one; however, it cannot be determined that one causes the other. Instead, it is thought that the two variables, obesity and peer relationship problems, effect each other simultaneously (Field & Kitos, 2009). Peer relationship problems have been noted at higher rates in overweight or obese children and they affect a wide range and type of relationships. Because of this and the simultaneous relationship they have with each other, it was vital to consider peer relationships as a significant influence on obesity as well as consider obesity as a significant influence on peer relationships.

Peer relationships are a major component of children's day to day lives. Studies show that peer relationships can be challenging for children and adolescents who are overweight or obese. Some research indicates obese children believe that their weight has interfered with their participation in social activities (Bullen et al., 1963; Tiggeman & Rothblum, 1988). Other studies showed that non-obese children reported fewer problems with social support, size of social networks, social skills, or socially based self-esteem than their obese peers (Sallade, 1973; Jarvie et al., 1983). Likewise, studies show that peers rate obese children more negatively than they do average weight peers on expected social traits (Harris et al., 1982; Harris & Smith, 1983). Peer relationships are central in the developmental context of childhood and adolescence, and the literature demonstrates that obese children experience impairment in this area due, at least in part, to their weight status (Steinbeck, 2008; Puhl et al., 2008; Kopelman et al., 2008).

School is an area where children and adolescents with obesity regularly deal with peer problems. At school, obese children and adolescents often endure harassment, rejection, bullying, teasing, and marginalization (Neumark-Sztainer et al., 2002). This marginalization and teasing may occur because of negative stereotypes and stigmas associated with being obese. These stereotypes and stigmas are often manifested as some form of the idea that obese individuals are lazy, sloppy, dirty, ugly, or stupid (Caskey & Felker, 1971).

Family Relationships

Family relationships are also central in the developmental context of children and adolescents and play an important role for children who are overweight or obese (Lachal et al., 2012). Negative stereotypes and stigma do not only come from peers or other children, but are frequently part of family dynamics as well. Literature suggests that family bonds, caregivers, and parents are of the most important relationships affecting the condition and treatment of obesity (Ventura & Birch; Epstein et al., 2007).

Of family relationships, the parental relationship is one of the most, if not the most, important relationships. Both verbal and non-verbal communication from parents has been shown to either buffer or cause more stigma for their children who are overweight or obese, showing that parents have a significant impact on the way that their children view their bodies (Valtolina & Marta, 1998). Not all parents have the same focus on obesity, nutrition, or physical activity. In one study, approximately one third of parents of obese children did not understand the connection between nutrition, physical activity, and childhood obesity. These parents tended to display communication styles that conveyed lack of confidence in helping their children

(Akhtar-Danesh et al., 2011). Parental concern is one of the largest reasons for obesity intervention; however, one study suggests that physical activity and nutrition are not among the top reasons parents are concerned for their child's obesity. The study found that the child's BMI status, gender (parents of female children reported more concern), and parent's perception of their weight were the top reasons parents were concerned about their child's obesity.

Parental stress is much higher in parents with children who have medical problems, than in those who have healthy children (Chiou & Hsieh, 2008; Streisand et al., 2003). Likewise, parental stress can impact the relationship between parents and obese children. Perception of childhood obesity is correlated with the amount of stress that a parent feels, suggesting that parental stress is a significant psycho-social factor within the parent child dyad in relation to obesity (O'Neil et al., 2010). This relationship is further complicated because parental stress has been shown to compromise children's psychological well-being when children already have chronic illness (Cushner-Weinstein et al., 2008; Mullins et al., 2007; Ohleyer et al., 2007). Further literature reflects the relationship between parental stress and HRQOL, which is an indicator of an individual's overall wellbeing, and children who are obese. It shows that parental stress was a significant predictor of parent-proxy HRQOL, meaning, as parental stress increased, parent perceived HRQOL of their children decreased (Guilfoyle et al., 2010). Though it is relatively unexplored in the literature, studies show that parental stress can increase parent perception of obesity, compromise psychological well-being, and diminish parental perspective of HRQOL for children who are overweight or obese. This made parental stress a crucial component to explore in regards to children who are overweight or obese and their well-being.

Psychological Problems

Childhood obesity carries with it many consequences; some of these consequences manifest themselves as psychological problems. Psychological problems are important to consider in children and adolescents who are overweight or obese, because of both the intensity of the distress as well as the potential for the psychological problems to carry over into adulthood (Steinbeck, 2008; Kopelman et al., 2008). Negative stereotypes and stigmatization do lead to negative esteem in obese children; however, body-esteem and body dissatisfaction are generally the most affected while generalized self-esteem only has a minor correlation with stigmatization (Hill et al., 1994).

Other types of psychological distress within the obese population can be seen in the context of behavior. Literature suggests that one of the most prevalent problems in this population is the lack of motivation to make changes (Mehlenbeck & Wember, 2009; Jelalian & Steele, 2009). Likewise, behavioral problems reported by parents and teachers, such as attention deficit hyperactivity disorder and oppositional defiant disorder, are more frequent in children who are overweight or obese (Braet & Van Strien, 1997; Mustillo et al., 2003). Disordered eating is yet another problematic behavior that is frequently exhibited in this population. Though opposite sides of the spectrum, both excessive dieting and binge eating behaviors can be seen in this population (Field et al., 1999; Braet & Van Strien, 1997).

The prevalence of both obesity and depression has increased in the United States for both children and adults (Seidell, 2008; Kopelman, 2008). Several studies indicate that adults with BMI in the overweight or obese category had higher rates of depression than individuals who were in a normal or underweight BMI category (Desai & Patoliva., 2011; Goodman & Whitaker,

2002). Though evidence is mixed, there is some literature to suggest that children who are obese show generally higher prevalence of depression than children of average weight (Zeller et al., 2004).

Determining if BMI is a significant predictor of depression is difficult because there are many things that could mediate the relationship between these two constructs. Possible mediators include perception of one's body (Desai & Patoliva, 2011), style of coping response (Koball & Carels, 2011), or motivation for change (Mehlenbeck & Wember, 2008). Because of the complex nature between BMI and depression it was unlikely that a causal relationship will be determined, though, this relationship was still vital to consider in developing research. One possible area of exploration was to determine how much of a role BMI plays on depression.

The existing literature suggests there are important links between obesity, maintenance of obesity, and depressive symptoms in children and adolescents. Depression has been shown as a risk factor for obesity in adulthood, as well (Pine et al., 2001; Richardson et al., 2003). Likewise, obese adolescents who had high levels of depressive symptoms were more likely to maintain an obese level of BMI over time. This shows that depression is linked to youth persisting in their obesity over long periods of time (Goodman & Whitaker, 2002; Mustillo et al., 2003).

Much like other disorders, depression and obesity have a cyclical relationship with each other. Obesity may have an effect on depression and depression may also then affect obesity (Puder, 2010). Internalizing disorders have been shown to put adolescents and young adults at risk for obesity, particularly when the disorder is depression (Goodman & Whitaker, 2002). Some groups are at an even greater risk. Several studies show that this risk is greater for girls, as

depression becomes a greater predictor of adolescent and early adulthood obesity in girls than boys (Anderson et al., 2006; Blaine, 2008; Hillman et al., 2010).

When looking at the effect of obesity intervention on BMI, studies have found indirect positive effects on depressive symptoms (Clarke et al., 2011). Similarly, when looking at the effect of intervention on depressive symptoms, studies have found indirect effects on BMI (Washington, 2008). Just as depression was shown to put children at risk of obesity later in life, obesity seems to put children at risk of mental health problems later in life. This again is most prevalent in girls and obesity has been shown to predict risk for depression specifically (Anderson et al., 2007).

When looking specifically at the symptoms of depression, similarities to causes of obesity can be seen. Negative cognitions, social withdrawal, anhedonia, and low motivation can reduce physical activity in children and can be seen in both depressed individuals and obese individuals. Likewise, increased appetite can increase a child's weight and can also be seen in both depressed and obese individuals. These indicators can predict both depression and obesity (Roemmich et al., 2007). Although the relationship between depression and obesity is complex, it is clear that it exists. Both depression and obesity can cause major problems and increase risks for other physical and mental health problems. Because of this, the relationship between depression and obesity warranted more exploration in research to help more clearly define the role that depression has on obesity and the role that obesity has on depression in children.

In regards to behavioral and psychological problems associated with obesity overall, it is difficult to determine a causal relationship. In behavioral problems, it is difficult to assess whether obesity causes behavioral problems, or if behavioral disorders have deregulated

children's nutrition and physical activity to the extent that obesity is a byproduct (Steinbeck, 2008; Kopelman et al., 2008). It becomes less clear when exploring the idea that eating can be a coping mechanism to these psychological problems. Psychological stressors can often produce an eating reflex that decreases negative stressors for a short time before a rebound effect of high negative stressors occurs (Schulz & Laessle, 2012). This style of coping may become circular as stress from obesity causes eating and that eating causes greater obesity.

HRQOL in Overweight or Obese Children

Although much of the attention in the literature has traditionally been on the increased risk for psychological problems such as depression in obese youth, other constructs have been shown to be associated with childhood and adolescent obesity, including HRQOL, an indicator of overall wellbeing, physical health, mental health, and social health (Zeller et al., 2006). There are several important predictors of HRQOL, including body image, body esteem, age, gender, and experiencing of bullying. However, one of the most robust predictors of HRQOL in the overweight or obese population is BMI, since obesity has been linked to lower HRQOL (Renzaho et al., 2010; Haraldstad et al., 2011; Zeller et al., 2006). Since HRQOL assesses many domains of health, it can be more readily shown that psychological and medical problems associated with obesity can negatively affect physical comfort, body esteem, social life, family relations, emotional well-being, and general quality of life (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008).

Though no causal relationship has been discovered, there is ample evidence to show that HRQOL and BMI are related. When investigating HRQOL of individuals with healthy weight,

several studies show that individuals who are within a normal BMI range tend to report higher HRQOL ratings compared to underweight or overweight individuals. This helps to show that a healthy weight is an important predictor of good HRQOL (Keating et al., 2011; Renzaho et al., 2010). Many studies have shown correlations between HRQOL and BMI for people with overweight or obese BMI's (Renzaho et al., 2010; Williams et al., 2011; Al-Akour et al., 2012; Keating et al., 2011). In the domains of social, physical, and emotional HRQOL, this relationship has been found to be even stronger, suggesting that these particular domains are even more affected by BMI (Keating et al, 2011; Al-Akour et al., 2012; Renzaho et al., 2010).

This relationship is further strengthened when looking at more specific groups of overweight and obese individuals. When studies look at age and gender they find that adolescent and young adult females have the most significant prediction of lower HRQOL based on BMI (Williams et al., 2011; Keating et al., 2011, Al-Akour et al, 2012). The relationship seems to be stronger in adult women than it is in men (Cameron et al., 2012). Additionally, for girls alone, a generally lower quality of life was a predictor of obesity in adolescence (Al-Akour, 2012).

Furthermore, various other factors can help strengthen the relationship between BMI and HRQOL. Self-stigma, avoidance, being bullied, and body image were all significant mediators of the relationship between BMI and HRQOL (Haraldstad et al., 2011; Lillis et al., 2011). Like many of the negative consequences of being overweight or obese, lower HRQOL tends to be associated more with specific groups such as adolescents and girls. These findings confirm what previous literature suggested about symptomology and obesity, but the strength in the relationship between BMI and HRQOL made this an interesting area to continue research.

Studies have shown that there is a bidirectional relationship between HRQOL and obesity. Obesity predicts lower HRQOL (Zeller et al., 2006), and HRQOL is a predictor of obesity in both adolescent and adult groups (Nadeau et al., 2011; Modi et al., 2008). Very little, if any, literature is available for the relationship between HRQOL and obesity in children ages 13 or lower. This is a critical age to study because of the effect that obesity has on development in such areas as peer relationships, physical activity, problem solving, mastery, self-efficacy, and self-esteem. Also, childhood obesity is commonly carried into adulthood, causing long term damage to the individual's future development as well as societal consequences (Chaput & Tremblay, 2006). The current research in this area helped to determine if impairment to HRQOL is a predictor of developmental challenges. The lack of literature in this area combined with the importance of the subject matter made this an ideal starting point for research.

Parenting Stress and HRQOL

As discussed earlier, the role of the family plays a significant part in overweight and obese children's health. For families with higher levels of life stress, it was generally predicted that both the parents and children would have poorer health outcomes (Helgeson et al., 2012). Looking specifically at the parent's role in the family, parenting stress is an area where the literature has suggested a relationship to obesity. In a sample of parents of obese school-aged children, 18% had clinical levels of parenting stress; while parenting stress did not directly predict BMI, it did predict lower HRQOL scores on parent forms (Guilfoyle, et al., 2010). In another study, parents of children with problems regarding health and well-being experienced

more parenting stress than parents of healthier children (Chiou & Hsieh, 2008; Streisand et al., 2003).

Parents tend to have varying education and understanding of the causes of obesity and its co-morbidities. A majority of parents in one study indicated that exercising, sports, and nutrition were important for maintaining a healthy weight. However, parents did not indicate that problems with parenting could be a predictor of obesity (Akhtar-Danesh et al., 2011), demonstrating that parents may not understand the influence that their own parenting has on their children's health. Although parents may not see parenting stress as a direct link to obesity, one study suggests that parents with greater amounts of parental stress tend have a greater perception of their children's obesity and increased likelihood of seeking treatment for their children (O'Neil et al., 2010; Epstein et al., 2000), again suggesting that parental stress has implications for HRQOL and other treatment outcomes.

There are several implications for outcomes of obese children when their parents are experiencing high levels of parenting stress. Overall, greater parental stress has been associated with poorer child outcomes in all areas of well-being. Studies suggest that parental stress is shown to compromise mental health outcomes such as depressive symptoms and self-care behaviors (Helgeson et al., 2012). This effect on mental health is noted to be specifically present when the child already has a chronic illness, such as obesity (Cushner-Weinstein et al., 2008; Mullins et al., 2007; Ohleyer et al., 2007), suggesting that for children with chronic health conditions, the presence of stress in a parent may put children at risk for worse outcomes.

The caregiver role (mother vs. father) seems to be important in the relationship between parenting stress and HRQOL. Maternal distress is the most frequent type of parental stress and

has many implications for HRQOL (Zeller & Modi, 2008). Studies have shown that 28 to 50% of mothers of children who are overweight or obese experienced clinical levels of distress (Epstein et al., 1996; Zeller et al., 2004). These rates are significantly higher for mothers of overweight or obese children than mothers of children who were of lower weight (Zeller et al., 2007), while rates for fathers generally remained within a normal range whether their children were overweight or not (Epstein et al., 1994b; Zeller et al., 2007). These rates of maternal distress are problematic because literature demonstrates that this distress can lead to poor outcomes in both physical and mental well-being (Beardslee et al., 1998; Burke, 2003; Epstein et al., 1996; Zeller et al., 2004). There is a clear relationship between maternal parenting stress and lower HRQOL outcomes; however, maternal parenting stress is highly correlated with seeking out treatment and completing treatment programs (Epstein et al., 2000; Zeller et al., 2004b). While this may be seen as a silver lining to maternal stress there are two caveats to this variable. The first is that children of mothers with high parental stress generally had poorer physical well-being outcomes (Epstein et al., 1994). The second being that maternal stress improved during the time of treatment but the benefits of parental stress relief were not continued after treatment ended (Epstein et al., 2000). This is thought to occur because the structure and support of treatment helps to alleviate parental stress, but the parental stress returns when the support of treatment is removed. It may also help to explain why long term outcome goals are poorer within this group, because the returning parental stress may hinder the mothers' skills needed to adopt a healthier lifestyle (Zeller & Modi, 2008). The mothers' role in their children's HRQOL is a very important one. When mothers report high rates of parental distress, there are significant HRQOL impairments based on this relationship. While mothers with high rates of parental

stress do tend to seek out treatment, it is noted that it still remains a problem, even after successful completion of treatment programs.

Parental stress was an important factor to consider in HRQOL outcomes of children who are overweight or obese. Though, this area is relatively new in literature, there is enough evidence to suggest that further study was warranted. More research into the relationship between parental stress and HRQOL could help to identify families in need of support and guide interventions that target HRQOL and health improvements (Guilfoyle et al., 2010; Cline et al., 2011).

Relevance of HRQOL

Research on the relationship between obesity and HRQOL in children is still fairly young (Zeller & Modi, 2006). Further, the measurement of HRQOL in literature and practical application is a somewhat new area of consideration (Zeller & Modi, 2008). Thus, this was an important area to continue to explore and expand the literature.

Since HRQOL is relatively new there are large sections of theoretical literature that are missing (Zeller & Modi, 2008). One area that is lacking theoretical background is in the medical application of HRQOL, since many hospitals, clinical trials, and health care professionals do not use these measures frequently. Some areas, such as oncology and cardiology, have begun to adapt their practice to using HRQOL. Recently more and more clinical trials have begun using these types of measurements as well, suggesting that medical treatment is adapting to using HRQOL over time (Hays et al., 2005; Howard et al., 2011; Erhart & Ravens-Sieberer, 2006;

Zeller & Modi, 2008). It may be necessary for the health professional's focus to shift if the theoretical background is to catch up to using HRQOL in medical treatment (Bullinger, 2002).

HRQOL is most useful in finding morbidities in the areas of social, emotional, and mental health. Beyond its ability to find specific morbidities, it also has been shown to measure general well-being reliably. These contributions of treatment tracking make HRQOL a practical and usable application for health care professionals (Hays et al., 2005; Howard et al., 2011; Erhart & Ravens-Sieberer, 2006).

Theoretical framework is still being built around the construct of HRQOL as practical application grows. Though the use of HRQOL as a construct was relatively new, the ease of use, breadth of tracking ability, and the practical application of it made it a very relevant area of consideration in both research and treatment.

Measurement of HRQOL and Symptomology

Measurement of HRQOL is a relatively new concept when compared to measuring symptomology of internalizing or externalizing disorders. That being said, HRQOL measurement has greatly increased in use over the last decade (Zeller & Modi, 2008). One reason that it has increased in usage is that it measures a broad spectrum of health, including physical, social, and emotional well-being, that come directly from the patient's own perspective (Schipper et al., 1996). Another reason for the increased usage of these measures is the flexibility in measurement, since there are many HRQOL measures that allow for cross-disease measurement or condition-specific measurement (Zeller & Modi, 2008).

There is ample evidence to show a relationship between obesity and HRQOL. Many investigators have found significant impairment in HRQOL when the patient is obese (Fallon et al., 2005; Friedlander et al., 2003; Ravens-Sieberer et al., 2001; Schwimmer et al., 2003; Stern et al., 2007; Swallen et al., 2005; Wake et al., 2002; Williams et al., 2005; Zeller & Modi, 2006; Zeller et al., 2006), and HRQOL scores decrease as BMI increases (Williams et al., 2005). This relationship holds true in both general areas of HRQOL such as psychological, self-esteem, friends, and school as well as condition-specific areas of HRQOL such as; oncology, cardiology, and obesity (Ravens-Sieberer et al., 2001; Ravens-Siberer & Bullinger, 1998; Hays et al., 2005; Howard et al., 2011; Erhart & Ravens-Sieberer, 2006; Zeller & Modi, 2008). The measurement of HRQOL provides information about how obesity specifically affects a child's quality of life in various domains.

In the recent past, HRQOL was measured using broad quality of life measures, such as the Peds-QL, which measures how the child's general medical condition affects areas of functioning (Varni et al., 2001). These measures were known to lack specificity and sensitivity to any particular condition or disease (Quittner et al., 2003). However, recently new condition-specific HRQOL measures become available, including obesity specific measures (Kolotkin et al., 2006). This is vitally important, because these measures open up the possibility of capturing the impact of obesity specifically on areas of functioning, something that symptom based measures and general HRQOL measures historically have not been able to do (Zeller & Modi, 2008).

HRQOL is becoming an increasingly used measurement because it covers a broad spectrum of well-being, it can measure condition-specific areas, and captures the child's own

perspective on well-being. Despite these positive merits to using HRQOL as an outcome measure, treatments generally do not track HRQOL (Revicki et al., 2000; Zeller & Modi, 2008). Measurement of HRQOL is still fairly young, but there are many features of this type of measurement that warranted its attention as an outcome goal.

There is ample literature that looks at the relationship between depressive symptoms and obesity, suggesting that there is some relationship between the two variables (Braet et al., 1997; Britz et al., 2000; Epstein, et al., 1994; Erermis et al., 2004; Sheslow et al., 1993; Zeller et al., 2004; Isnard et al., 2003; Tanofsky-Kraff et al., 2004). However, this relationship is not as strong as one might predict. There is contrasting literature that suggests depressive symptomology is not consistently correlated with obesity in children and adolescents (Goodman & Whitaker, 2002; Lamertz et al., 2002; Young-Hyman et al., 2003; Zeller & Modi, 2006). This suggests that measurement of depression may not capture the true impact of obesity on psychosocial functioning in youth.

One major caveat to measuring symptomology of depression as the primary measure of the psychosocial impact of obesity is that children and adolescents often have internalizing symptoms without meeting the criteria for a depressive disorder (Zeller & Modi, 2008; Zeller and Modi, 2006), and when looking at the diagnosis of major depressive disorder, children and adolescents with obesity have similar rates of depression as their peers in a healthy weight range (Kovacs, 1992). Further, rates of depression vary depending on who the informant of the measure is. For example, mothers of obese children describe them as having greater rates of depression and internalizing symptoms than the children report about themselves (Tanofsky-Kraff et al., 2004; Zeller, et al., 2004), raising some question about the potential impact of

maternal distress on reporting. The relationship between maternal stress and poor psychological health, as reported by mothers, actually correlates higher than other factors such as BMI, age, race, or gender with psychological health (Epstein et al., 1996; Zeller et al., 2004). Some studies have shown that there is a bias in mothers who are experiencing stress, in that they may over report symptoms of depression and internalizing symptoms (Renouf & Kovacs, 1994; Sanger et al., 1992). Taken together, these findings highlight the importance of multiple reporters, as well as a measure that captures the impact of obesity in a more broad fashion than the measurement of depressive symptoms.

A final caveat to using depression symptomology as a measure is that it is not normed to specific populations. Some HRQOL measures have condition-specific measurements, such as obesity specific HRQOL, that are normed to those populations (Varni et al., 2001; Landgraf et al., 1996), whereas, depression symptomology measures use generalized information to determine if someone meets criteria for a depressive disorder without norms to specific populations, like obesity (Knight, 1984).

Measuring depression and internalizing behaviors through symptomology has been useful in finding a connection between obesity, maintenance of obesity overtime, and risk of obesity in adulthood. Although there are many benefits to using symptomology there are also many limitations. This includes inconsistencies in correlations, minimizing non-clinical internalizing symptoms, maternal bias, and non-condition-specific normative samples. Because of these strengths and limitations it was important to consider that measuring symptomology can be helpful, but may not be reliable enough to use on its own.

Statement of the Problem

Obesity is a major problem for children and adolescents in America. Rates have reached epidemic proportions, with around 30% of children and adolescents being overweight or obese, and there is no indication that the prevalence will decrease in the near future (Seidell, 2008; Kopelman et al., 2008; Sarwer & Dilks, 2011). Historically, the impact of obesity on the child has been measured by looking at the relationship between obesity as measured by BMI, and health consequences, and/or symptoms of psychiatric conditions including depression (Forbes & Halloran, 1976; Reddy, 1991; Proietto, 2008; Pinkney, 2008; Steinbeck, 2008; Kopelman et al., 2008; Nadeau et al., 2011; Maitra & Payne, 2004; Braet et al., 1997; Britz et al., 2000; Epstein, et al., 1994; Erermis et al., 2004; Sheslow et al., 1993; Zeller et al., 2004; Isnard et al., 2003; Tanofsky-Kraff et al., 2004). However, HRQOL is another vital area to measure in children with obesity because it specifically addresses as the impact of the child's obesity on their physical, emotional, and social functioning (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008; Schipper et al., 1996).

Obesity manifests itself in several ways. On a societal scale there are implications for consequences in education, academic achievement, and health (Puhl et al., 2008; Kopelman et al., 2008). Medically, obesity can cause several health impairments including high blood pressure, high cholesterol, Type II Diabetes, acanthosis nigricans, cardiovascular disease, respiratory problems, and sleep apnea (Proietto, 2008; Pinkney, 2008; Steinbeck, 2008; Kopelman et al., 2008; Nadeau et al., 2011; Maitra & Payne, 2004). Relationships can also be negatively affected including relationships with peers, friends, family, or romantic partners. Similarly, children and adolescents who are obese tend to be teased, marginalized, and bullied

more than children of an average weight (Kopelman et al., 2008; Puhl et al., 2008; Neumark-Sztainer et al., 2002; Caskey & Felker, 1971).

Literature shows that the parental relationship is one of the most important relationships to consider for children who are obese, because in parents with higher levels of life stress, it was generally predicted that both the parents and children would have poorer health outcomes (Helgeson et al., 2012). Likewise, parenting stress predicted lower HRQOL (Guilfoyle, et al., 2010). Based on the observed relationship between parenting stress and obesity and the limited amount of literature on the topic, it is an area that is ideal for further research.

Another serious comorbidity of obesity is in the form of psychological problems such as depression. These problems are important to consider because of the intensity, distress, and potential to carry on into adulthood (Steinbeck, 2008; Kopelman et al., 2008). Though evidence is mixed, obese children generally show higher prevalence of depression than other children of average weight (Zeller et al., 2004). Specific groups of obese individuals seem to be at even higher risk of depression, including girls and adolescents (Anderson et al., 2006; Blaine, 2008; Hillman et al., 2010). Although much of the attention in the literature has traditionally been on the increased risk for psychological symptoms, other constructs have been shown to be associated with childhood and adolescent obesity, including HRQOL, an indicator of physical health, mental health, social health, and overall well-being.

Obesity has been linked to lower levels of HRQOL, likewise, children with an average weight tend to predict higher levels of HRQOL (Zeller et al., 2006; Keating et al., 2011; Renzaho et al., 2010), and since HRQOL assesses many domains of health, it can be more readily shown that psychological and medical problems associated with obesity can negatively affect physical

comfort, body esteem, social life, family relations, emotional well-being, and general quality of life (Nadeau et al., 2011; Herzer et al., 2011; Modi et al., 2008).

Measurement of HRQOL is a relatively new concept when compared to measuring symptomology of internalizing or externalizing disorders. That being said, HRQOL measurement has greatly increased in use over the last decade (Zeller & Modi, 2008). Findings on HRQOL not only confirm what the literature has already suggested about the relationship between obesity and symptomology, but also open new self-perceived problem areas to consider (Zeller & Modi, 2009). HRQOL is diverse in its assessment because it allows for both cross disease or condition specific measurements (Zeller & Modi, 2008). Its relationship with obesity and diversity in assessment combined with the fact that there is very little information available about the relationship between obesity and HRQOL in children (Zeller & Modi, 2006) made this an ideal area to continue research.

In the distant past, the literature described obese children as fundamentally unhappy and maladjusted (Bruch, 1941). This statement posits that the relationship between obesity and emotional well-being is very clear cut and direct. However, the more literature that is produced on this topic, the more data we have to suggest that the relationship is more complicated than it was previously thought to be. High rates of depression and clinical levels of internalizing symptoms are not inherently greater for children who are obese. Nevertheless, some obese children seem to be at higher risk of depression than others (Zeller & Modi, 2008), making the relationship between depression and obesity something still worth considering in future literature. It is known that the relationship between HRQOL and obesity is complicated. It is clear, though, that there is a relationship between these two variables and that overweight and

obese children have significant impairments to HRQOL (Zeller & Modi, 2008), and made it a vital area for new and continued research.

Chapter III: Method

This chapter explains the methodology used in the study. The nature of the data are retrospective after collection from a clinical program. The data have been compiled into a de-identified database. This chapter also includes hypotheses, proposed analyses, and the expected results.

Participants

Participants included approximately150 children 5-13 years of age and their parents living in the Central Texas area. The children were identified by their pediatrician as being overweight (above the 85th percentile for Body Mass Index for age and sex) or obese (above the 95th percentile for BMI for age and sex) and referred to participate in the Healthy Living, Happy Living program, a 10 week multidisciplinary program for overweight children and their families at Dell Children's Medical Center.

Demographic information

Participants answered questions on the pre-participation form relating to their age, race, and preferred language.

Procedure

Approval by the Human Subjects Committee. This study was a retrospective study that used existing data from a de-identified database of participants from a clinical program. Before beginning this data analysis, all materials were submitted for approval to the Institutional Review Board for the Protection of Human Subjects at the University of Texas at Austin. This study was in compliance with the ethical standards set forth by the American Psychological Association's

(APA) Code of Ethics for research with human subjects. The database used for the proposed study was de-identified and identity of participants was kept anonymous.

Data Collection

Collection of existing data occurred during the initial intake session for the Healthy Living, Happy Living program at Dell Children's Medical Center. Data exist in a database as de-identified data.

Measures

Body Mass Index (BMI)

Data collection has included height and weight of the participant. From these two figures BMI can be calculated. BMI is a calculation used to describe general weight related health categories. BMI was calculated as a ratio of weight (in kilograms) to height squared (in meters) [————]. The BMI categories are underweight, normal, overweight, obese, and morbidly obese. These categories are age dependent, but generally the categories can be accurately described with percentiles: 1^{st} to 5^{th} underweight, 5^{th} to 85^{th} normal, 85^{th} to 95^{th} overweight, 95^{th} to 99^{th} obese, $>99^{th}$ morbidly obese (CDC, 2011).

The Children's Depression Inventory (CDI)

(Kovacs, 1982) The CDI measures the presence and severity of specific depressive symptoms through a self-report scale. The CDI consists of a 27-item questionnaire in which the participant selects answers from 3 possible choices. Examples of statements include "I am sad many times" or "I like myself". The measure is based on a five factors including negative mood, ineffectiveness, negative self-esteem, anhedonia, and interpersonal problems. This scale was used to assess the amount of depression and depressive symptoms that the participants feel.

Higher scores indicate higher levels of depression symptoms. Raw scores of the composite can range from 0 to 54. Test-retest reliability over 6 weeks ranged from .66 to .82 in a heterogeneous sample of children (Finch et al., 1987). Internal consistency of the CDI as measured by coefficient alpha was reported as .86 with heterogeneous samples (Ivarsson et al., 2006).

The Sizing Me Up/Sizing Them Up (SMU/STU)

(Modi & Zeller, 2009; Modi & Zeller 2008) The SMU/STU measures weight specific health related quality of life. The SMU is child report and the STU is parent report. The SMU consists of 22 phrase oriented questions that are designed to measure for five factors, including emotional functioning, physical functioning, social avoidance, positive social attributes, and teasing/marginalization as well as a total score. The scale is designed to rate quality of life in regards to being overweight. Higher scores indicate higher quality of life. Scores can range from 0% to 100% quality of life. Test-retest reliability ranges from .53 to .78 in a heterogeneous sample (Zeller & Modi, 2009). Internal consistency of the SMU ranges from .68 to .85 with a heterogeneous sample. The test also shows good face validity and the convergent validity when compared to the STU is .22 to .44 (Zeller & Modi, 2009).

The STU consists of 28 items that are designed to measure seven factors including emotional, physical, teasing and marginalization, positive attributes, mealtime, school, and adolescent development adaptation as well as a total score. The scale is designed to rate quality of life in relation to weight, as an outside observer. The scores range from 0% to 100% quality of life. Test-retest reliability ranges from .57 to .80. Internal consistency of the STU ranges

from .59 to .91with a heterogeneous sample. The test also shows good face validity and the convergent validity when compared to the SMU is .22 to .44 (Modi & Zeller 2008).

Parenting Stress Index Short Form (PSI)

(Abidin, 1990) The PSI is designed to measure stress associated with parenting a child. It is a self-report measure that is completed by the parent. The PSI consists of 36 phrase-oriented items that are designed to measure major domains in parental distress, parent-child dysfunctional interaction, and difficult child as well as a total score. Higher scores indicate higher rates of parental stress. Scores can range from 36 to 180 Test-retest reliability ranges from .61 to .75. Internal consistency of the PSI ranges from .74 to .88 with a heterogeneous sample (Haskett et al., 2006).

Data Analysis

The primary purpose of this study was to examine the relationship between depression and the HRQOL. Independent samples *t*-tests were used to determine if there are any gender differences for depression or HRQOL within the sample. Data for both children and parents were correlated using bivariate correlations. Partial correlations controlled for BMI and be used to test the relation between depression and HRQOL. Finally, a simple path analysis was used to determine the relation between parental stress and HRQOL.

Power Analysis

An a priori power analysis was conducted for a bivariate correlation and, although there is no literature to suggest what a probable correlation between HRQOL and depression might be, there is literature to suggest that there is a moderate correlation between depression and health problems due to obesity (Groomland & Whitaker, 2002). Generally a moderate correlation is

between .3 and .5 (Cohen, 1988), so a coefficient of .4 was used. G*Power Version 3.1.2 was used to calculate the total sample size needed with an a priori power analysis for a bivariate correlation (Faul, 2009). The analysis used an estimated correlation coefficient of .4, an alpha value of .05, and a beta value of .8 (to indicate power). With this information, the estimated total sample size needed was 35 for analyses involving bivariate correlations. Secondarily, an a priori power analysis was run for an independent samples t-test for analyses of gender differences. There is literature to suggest that there are gender differences in depression for participants who are overweight or obese (Anderson et al., 2007); however, there is no literature to suggest that there are gender differences for HRQOL for participants who are overweight or obese. Based on previous research, a moderate effect size of .5 was used for this analysis. The analysis used two tails, an effect size of .5, an alpha value of .05, and a beta value of .8. With this information, the estimated total sample size needed was 128 (64 per group) for analyses involving independent sample t-tests.

Preliminary Analysis

Means and standard deviations were computed for each of the tests. In order ensure that all variables are reasonable and reflect their appropriate scales of measurement, the data were checked by examining the descriptive statistics (i.e., means, standard deviations, and ranges) as well as skew and kurtosis, using IBM SPSS. Additionally, the assumption of normality was assessed and adjusted for if violated by removing extreme values that are likely made in error. Bivariate correlation was used to assess the correlations between scales and their subscales. All analyses were made using IBM SPSS Statistics Version 17 (Levesque, 2007).

Research Questions and Hypotheses

Research Question 1

How does depression relate to health related quality of life in children who are overweight or obese?

Hypothesis 1

The correlation between depression and HRQOL will be moderate or higher and statistically significant.

The total score of the CDI (representing depression) and the total score of the SMU (representing HRQOL) were used to determine how these constructs relate to one another. It was hypothesized that the total scores of depression and HRQOL would have a moderate correlation with each other. It was predicted that it would be a negative correlation, meaning, as depression increases, HRQOL would decrease.

Rationale 1

Though evidence is mixed, there is some literature that suggests that children who are obese have generally higher rates of depression than children of average weight (Zeller et al., 2004). Regarding HRQOL, there is very little if any information about how it relates to children who are obese (Zeller & Modi, 2006). However, in adult populations, depression has been shown to be correlated to HRQOL (Rief et al., 2012), suggesting that they are related. Since HRQOL has been shown to be a sensitive and condition specific measurement (Kolotkin et al., 2006), answering this research question will provide valuable insight into finding a comparable, accurate, and more sensitive measure of well-being for children who are obese. This will

provide feedback to clinicians and possibly improve the way we measure psychosocial aspects of obese children.

Data Analysis

The first hypothesis was tested by using a bivariate correlation between the total score of the CDI and the total score of the SMU. The correlation coefficient was displayed in Pearson r. Scores between .3 and .5 were considered a moderate correlation (Cohen, 1988). It was predicted that the correlation would be negative, so scores between -.3 and -.5 would be predicted. Both measures are considered dependent variables to a larger construct, so no causal relationship was measured.

Hypotheses 1 through 4 were tested through a bivariate correlation between the relevant scales and used moderate correlations in their predictions.

Research Question 2

How does child depression relate to the parent's perspective of health related quality of life in children who are overweight or obese?

Hypothesis 2

The correlation between depression and parent perspective of HRQOL will be moderate or higher and statistically significant.

The total score of the CDI (representing depression) and the total score of the STU (representing parent perspective of HRQOL) were used to determine how these constructs relate to one another. It was hypothesized that the total scores for depression and HRQOL would have a moderate correlation with each other. It was predicted that it would be a negative correlation, meaning, as depression increases, parent perspective of HRQOL would decrease.

Rationale 2

The parental relationship is one of the most important factors in how children perceive their bodies (Valtolina & Marta, 1998) and is a crucial area to explore regarding children who are obese. Some literature suggests that children who are obese have greater rates of depression than children of healthier weights (Zeller et al., 2004). Though there is limited literature regarding parent's perception of HRQOL in children who are obese (Zeller & Modi, 2006), correlations between depression and HRQOL have been found in adult populations (Rief et al., 2012), suggesting that the two variables are related. Since HRQOL has been shown to be a sensitive and condition specific measurement (Kolotkin et al., 2006), answering this research question provided valuable insight into finding a comparable, accurate, and more sensitive measure of well-being for children who are obese. This provided feedback to clinicians and possibly improved the way we measure psychosocial aspects of obese children and their parents.

Research Question 3

How do the major domains of depression relate to HRQOL and parent perceived HRQOL?

Hypothesis 3a

The correlation between major domains of depression and HRQOL will be moderate or higher and statistically significant.

Negative mood, ineffectiveness, negative self-esteem, anhedonia, and interpersonal problems were used as measures of the domains of depression. The CDI was used to measure these domains and the SMU was used to measure HRQOL. Five separate correlations were made to determine the relations between each depression domain with HRQOL. It was

hypothesized that each depression domain would have a moderate correlation or higher with HRQOL. It was predicted that it would be a negative correlation, meaning as depression domain scores are higher the HRQOL score would be lower and vice versa.

The correlation matrix can be viewed in Appendix A.

Hypothesis 3b

The correlation between major domains of depression and parent perceived HRQOL will be moderate or higher and statistically significant.

Negative mood, ineffectiveness, negative self-esteem, anhedonia, and interpersonal problems were used to represent the domains of depression. The CDI was used to measure these domains and the STU were used to measure parent perspective of HRQOL. Five separate correlations were made to determine the relationship between each depression domain with parent perspective of HRQOL. It was hypothesized that each depression domain would have a moderate correlation or higher with parent perspective of HRQOL. It was predicted that it would be a negative correlation, meaning as depression domain scores are higher the parent perspective of HRQOL score would be lower and vice versa.

The correlation matrix can be viewed in Appendix A.

Rationale 3

Both depression scales and HRQOL measure well-being (Nadeau et al., 2011; Kovacs, 1982). Depression measures commonly assess well-being in regards to negative mood, ineffectiveness, negative self-esteem, anhedonia, and interpersonal problems (Kovacs, 1982). Based on this information, depression and HRQOL have several overlapping domains in areas such as interpersonal health, social health, emotional functioning, mood, and self-efficacy

(Kovacs, 1982; Modi & Zeller, 2009). Similar domains can be assessed through parent perception of HRQOL (Modi & Zeller 2008). Though there is limited research that directly links depression and HRQOL in children, there is evidence to suggest that domains of depression and HRQOL are correlated in adults (Rief et al., 2012). Since HRQOL has been shown to be a sensitive and condition specific measurement (Kolotkin et al., 2006), answering this research question provided valuable insight into finding a comparable, accurate, and more sensitive measure of specific areas of well-being for children who are obese. This provided feedback to clinicians and possibly improved the way we measure psychosocial aspects of obese children.

Research Question 4

How do major domains of HRQOL and parent perceived HRQOL relate to depression?

Hypothesis 4a

The correlation between major domains of HRQOL and depression will be moderate or higher and statistically significant.

Emotional functioning, physical functioning, social avoidance, positive social attributes, and teasing/marginalization were used to represent the domains of HRQOL. The SMU was used to measure these domains and the CDI was used to measure depression. Five separate correlations were estimated to determine the relationship between each HRQOL domain with depression. It was hypothesized that each HRQOL domain would have a moderate correlation or higher with depression. It was predicted that it will be a negative correlation, meaning as HRQOL domain scores are higher the depression score will be lower and vice versa.

The correlation matrix can be viewed in Appendix A.

Hypothesis 4b

The correlation between major domains of parent perceived HRQOL and depression will be moderate or higher and statistically significant.

Emotional functioning, physical functioning, teasing/marginalization, positive attributes, mealtime, and school were used to represent the domains of parent perspective of HRQOL. The STU was used to measure these domains and the CDI was used to measure depression. Six separate correlations were made to determine the relationship between each parent perspective of HRQOL domain with depression. It was hypothesized that each parent perspective of HRQOL domain would have a moderate correlation or higher with depression. It was predicted that it would be a negative correlation, meaning as parent perspective of HRQOL domain scores are higher the depression score would be lower and vice versa.

The correlation matrix can be viewed in Appendix A.

Rationale 4

Both depression and HRQOL measure well-being (Nadeau et al., 2011; Kovacs, 1982). HRQOL measures commonly assess emotional functioning, physical functioning, social avoidance, positive social attributes, teasing/marginalization, and school attributes (Modi & Zeller, 2009; Modi & Zeller 2008). Based on this information, depression and HRQOL have several overlapping domains in areas such as interpersonal health, social health, emotional functioning, mood, and self-efficacy (Kovacs, 1982; Modi & Zeller, 2009). Similar domains can be assessed through parent perception of HRQOL (Modi & Zeller 2008). Though there is limited research that directly links depression and HRQOL in children, there is evidence to suggest that depression and the domains of HRQOL are correlated in adults (Rief et al., 2012). Since HRQOL has been shown to be a sensitive and condition specific measurement (Kolotkin et

al., 2006), answering this research question provided valuable insight into finding a comparable, accurate, and more sensitive measure of specific areas of well-being for children who are obese. This provided feedback to clinicians and possibly improved the way we measure psychosocial aspects of obese children.

Research Question 5

Are there gender differences in the level of depressive symptoms or in HRQOL for overweight or obese children?

Hypothesis 5a

The rates of depression between boys and girls will not differ.

It was predicted that a comparison of the mean scores of girls and boys total scores depression would show that there are no significant gender differences in rates of depression. It was predicted that the difference between the mean scores would not be significant.

Data Analysis

This hypothesis was be tested by using independent samples t-test. Groups were separated by gender. Depression was measured with the means of the total score of the CDI and was tested for significant differences between the two groups. Scores were examined with p-values. Scores that are <.05 were be considered significant. The means were hypothesized to not be significantly different; the scores for the girls would not be higher than that of the boys and vice versa, indicating that there would be no significant gender differences in rates of depression for children who are overweight or obese.

Hypothesis 5b also used a t-test on the pertinent measures. Scores of <.05 were considered significant.

Hypothesis 5b

The level of HRQOL will not differ for overweight or obese boys and girls.

It was predicted that a comparison of the mean scores of girls and boys total scores for HRQOL would show that there are no significant gender differences in rates of depression. It was predicted that the difference between the mean scores would not be significant.

Rationale 5

Several studies show that depression becomes a greater predictor of adolescent and early adulthood obesity in girls than boys (Anderson et al., 2006; Blaine, 2008; Hillman et al., 2010). However, rates of depression in children are generally equal between boys and girls (Zeller et al., 2004). Though there is little evidence related to gender differences between levels of HRQOL in obese children, it is expected that HRQOL will not have gender differences. One study found, in a large sample of children and adolescents without health related problems, that levels of HRQOL remained the same for both boy and girls until adolescence (Michel et al., 2009). Replicating the findings for depression and discovering the gender differences for HRQOL in children who are obese may have helped clinicians and researchers in their understanding of development for this population.

Research Question 6

What is the relationship between depression and HRQOL when controlling for BMI?

Hypothesis 6a

The correlation between depression and HRQOL will reduce when controlling for BMI.

Data Analysis

The total scores of the CDI were used to measure depression and the SMU was used to measure HRQOL. These measures were be correlated, controlling for BMI (partial correlation). It was predicted that this partial correlation would be weaker than the correlation between depression and HRQOL when BMI is not controlled. It was predicted that this correlation would still be negative, meaning as depression increases, HRQOL would decrease and vice versa.

Hypothesis 6b

The correlation between depression and parent perspective of HRQOL will reduce when controlling for BMI.

Data Analysis

The total scores of the CDI were used to measure depression and the STU was used to measure parent perspective of HRQOL. These measures were correlated, controlling for BMI (partial correlation). It was predicted that this partial correlation would be weaker than the correlation between depression and parent perspective of HRQOL when BMI was not controlled. It was predicted that this correlation would still be negative, meaning as depression increases, HRQOL would decrease and vice versa.

Rationale 6

There is indicative evidence that suggests that as rates of BMI increase, the rates of depression also increase (Dave et al., 2011). There is limited literature on the relationship between BMI and depression in children, and what literature that is available is mixed (Zeller et al., 2004). However, studies show that individuals with a higher BMI are more likely to have depressive symptoms than individuals with a low BMI (Desai & Patoliva, 2011; Goodman & Whitaker, 2002). Similarly, in regards to HRQOL, there is limited literature related to BMI and

HRQOL in children; however, there is evidence to suggest that individuals with a high BMI more frequently experience lower levels of HRQOL (Keating et al., 2011; Renzaho et al., 2010). Based on this information, it is hypothesized that the correlation between depression and HRQOL would be highest in children with the highest BMI's, therefore; when controlling for BMI the correlation was predicted to weaken. Answering this question may have helped researchers and clinicians to better understand symptomology of children based on their BMI.

Research Question 7

How does parental stress affect HRQOL and parent perspective of HRQOL?

Hypothesis 7a

Parental stress will have a small and non-significant effect on HRQOL but parental stress will have a moderate and statistically significant effect on parent perspective of HRQOL.

Data Analysis

The total scores of the PSI, SMU, and STU were used to represent parental stress, HRQOL, and parent perspective of HRQOL in a simple a path analysis. It was predicted that the effect parental stress on HRQOL would be small and not statistically significant, but the effect of parental stress and parent perspective of HRQOL would be moderate or higher and statistically significant. The effect sizes were predicted to be negative, meaning as parental stress increases HRQOL would decrease and vice versa.

The hypothesis was tested by using path analysis. The model was set up so that parental stress has paths pointing to both HRQOL and parent perspective of HRQOL. The model is shown in Appendix B.

Hypothesis 7b

It is also expected that the two effects will differ to a statistically significant degree, with the path from parental stress to HRQOL weaker than the path from parental stress to parent perspective of HRQOL.

Data Analysis

The hypothesis was made by constraining the paths to be equal. It was expected that this constraint would result in a statistically significant decrement in model fit, as measured by ΔX^2.

Rationale 7

Family plays a significant part in overweight and obese children's health. As can be seen for families with higher levels of life stress, it was generally predicted that both the parents and children would have poorer health outcomes (Helgeson et al., 2012). Furthermore, in a sample of parents of obese school-aged children, 18% had clinical levels of parenting stress and reported lower parent perception of HRQOL but did not report lower scores for children's perception of HRQOL (Guilfoyle, et al., 2010). These studies show that there is a crucial role of parenting stress on HRQOL for parents of obese children, but this relation is not necessarily detected for the children. The replication of these results would help to solidify research and give insight to clinicians about the parental role of children who are obese.

Chapter IV: Data Analysis

The current investigation was designed to test the relation between depression, HRQOL, parenting stress, and obesity in children. Seven main research questions were investigated with analyses conducted using statistical software IBM SPSS 21.0 and AMOS 17.0.

Preliminary Analyses

Descriptive Statistics

Prior to the testing of hypotheses, descriptive statistics including sample sizes, means, standard deviations, and Cronbach's alpha were computed to provide descriptive information about the data. This information was computed for all participants, measures, and subscales as shown in Table 1. All measures were shown to have good internal consistency, and all means and standard deviations were within the expected ranges. Scale intercorrelations for measures used in the main analyses are presented in in Table 2. Table 2 also includes BMI percentile, as percentiles may be a more meaningful metric for intercorrelations, since healthy BMI ranges may vary drastically by age Although some participants were removed from various analyses based on missing measures, the analyses used the maximum sample size possible for each measure (Total $N = 81$).

General information about the participants can be taken from the data. The average scores for the sizing me up indicate that as a group this sample is experiencing moderately high levels of obesity specific HRQOL. The same can be said for the information gathered from the Sizing Them Up, which shows that parent's perception of their children's HRQOL is moderately high for this group as a whole. The average scores for the CDI indicate that as a group this

sample is experiencing non-clinical levels of depression, and that the sample is similar to the overweight and obese child population. The average scores for the PSI indicate that as a group this sample is experience at-risk levels of parenting stress, and higher levels than that of the general population of children in this age range.

Table 1

Means, Standard Deviations, and Cronbach's α, for Main Variables

Variable	*N*	Mean	Std. Deviation	α	Number of Items
Children's Depression Inventory					
CDI Total	77	11.6	8.7	.88	27
CDI Negative Mood	77	2.8	2.5	.76	6
CDI Interpersonal Problems	77	1.5	1.7	.77	4
CDI Ineffectiveness	77	1.6	1.6	.75	4
CDI Anhedonia	77	3.7	2.7	.79	8
CDI Negative Self-Esteem	77	2.1	2	.70	5
Sizing Me Up					
SMU Total	76	70.8	14.9	.83	22
SMU Emotional	76	75.9	26.6	.87	4
SMU Physical	76	80.4	22.3	.78	5
SMU Teasing	76	81.6	23.7	.72	2
SMU Positive Attributes	76	43.3	22.1	.74	6
SMU Social Avoidance	76	86	19.9	.77	5
Parenting Stress Index					
PSI Total	78	75.8	23.3	.94	36
PSI Parental Distress	78	26.6	9.8	.88	12
PSI Parent Child Dysfunction	78	22.2	8.9	.90	12
PSI Difficult Child	78	27	9.5	.89	12
Sizing Them Up					
STU Total	79	72.2	17.3	.91	22
STU Emotional	79	72.5	25.4	.93	7
STU Physical	79	78.5	19.8	.78	5
STU Teasing	79	76.7	25.4	.86	3
STU Positive Attributes	79	57.8	19.4	.71	4
STU Mealtime	79	67.3	25.8	.61	2
STU School	79	92.8	19.7	N/A	1
Body Mass Index					
BMI	71	27.8	5.6	N/A	1

Table 2

Pearson Product-Moment Correlations for all Measures

	CDI Total	SMU Total	PSI Total	STU Total
CDI Total	1.0			
SMU Total	-.285*	1		
PSI Total	.170	-.389**	1	
STU Total	.016	.252*	-.374**	1
BMI Percentile	.367	-.470	.022	-.300

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Assumptions for Statistics used in Main Analyses

The data were examined for violation of assumptions as required for the statistical procedures used to test the main analyses including bivariate correlation, independent samples *t*-test, partial correlation, and path analysis. Homogeneity of variance is an assumption that must be met when using independent samples *t*-tests. Levene's test of equality of error variances was conducted to determine whether or not the assumption of homogeneity of variance was met across the sexes. For all variables of interest, Levene's test was not statistically significant, indicating that the assumption of homogeneity of variance was met for each variable of interest.

Data were examined for normality. In order to test for this assumption, the data were examined visually for outliers using histograms and scatterplots. The skewness and kurtosis for each of the variables was also examined. No significant outliers were identified when reviewing histograms and scatterplots of the data.

Path analysis assumes linear relations between the independent and dependent variables. To examine whether or not the variables met the assumption of linearity, scatterplots were created for all variables and examined for linear relations by checking a plot of the residuals and predicted values. The points were also visually checked for symmetry and linearity. All variables used as independent and dependent variables appeared to meet the assumption of linearity.

Traditional maximum likelihood methods of path analysis assume that the continuous variables in the model are multivariate normally distributed (Arbuckle, 2009). The assumption of normality was assessed by examining the skewness and kurtosis for each of the variables. All of the following variables: parental stress, child reported HRQOL, and parent perception of

HRQOL, demonstrated a normal distribution, with skewness values within a range of -1 and +1 and kurtosis values within a range of -3 and +3, indicating that the data were normally distributed.

Missing Data

In order to make the most use of the available data and to avoid bias associated with removing participants with missing data, values were formulated for missing items through mean substitution. 0% to 11.3% of the data were missing at the item level. Missing components of subscales were handled by computing the mean score of items for each subscale for each participant. This imputation offered plausible values for missing data, and allowed for data to be comparable to the participant's response pattern for the subscale (Hofer, 2000). Given the internal consistency of the measures and relatively minimal amount of missing items, it is likely that this procedure did not result in biased parameter estimates. The percentage of individual item level missing data ranged from 0% to 11.3%. In several cases, entire measures were missing from participants records. These cases were not imputed, and instead were removed from analyses involving those measurements.

1 participant had large amounts of missing data (missing 93% of data). Enough data were missing that all measurements were deemed invalid. Furthermore, the participant's age was considerably older than that of the other participants. This participant was removed from the study to maintain accurate parameter estimates.

The computer program Amos was used to analyze the data to test one research question (Levesque, 2007). Amos utilizes full-information maximum likelihood (FIML) estimation when

analyzing datasets with incomplete data. Wothke described the FIML process as utilization of information from all observed data to estimate the means and covariances of the variables with missing data by maximizing with respect to first and second order moments (2000, p. 224). Kline described this as a process involving the division of all cases into subsets with the same patterns of missing observations, where all available statistical information is extracted from each subset, and all cases are kept in the analysis (2005, p. 56). FIML has been shown to be more effective than pairwise deletion, listwise deletion, and mean imputation in regards to missing data (Wothke, 2000). Current research supports the use of maximum likelihood imputation methods to handle missing data (Graham, 2009). The percentage of missing data from the measures used in path analysis ranged from 0% to 6.9%.

Main Analyses

Several types of analyses were conducted to test the research questions. Bivariate correlations, *t*-tests, partial correlation, and path analysis were conducted for the various hypotheses. An alpha level of .05 indicated a statistically significant value for all analyses. Correlations were considered as small if they were within the range 0 to .29, moderate between .3 and .49, and large if they were .5 or higher (Cohen, 1988).

Research Question 1

Research question 1 asked how depression relates to HRQOL in children who are overweight or obese. It was hypothesized that the correlation between the depression (measured by the CDI) and child reported HRQOL (measured by the SMU) would be moderate or higher and statistically significant. The correlation between depression and child reported HRQOL was predicted to be negative, meaning that as depression increased, child reported HRQOL would

decrease. The first hypothesis was tested by using a bivariate correlation between the total score of the CDI and the total score of the SMU.

As shown in Table 2, the bivariate correlation between the CDI and the SMU was small, negative, and statistically significant: $r = -.285$, $p = .013$. This indicates that the relation between depression and child reported HRQOL was small but significant, and in the direction expected: as depression (as measured by the CDI) increased, child reported HRQOL (as measured by the SMU) decreased.

Research Question 2

Research question 2 asked how depression related to parent perception of HRQOL in children who are overweight or obese. It was hypothesized that the correlation between the depression (measured by the CDI) and parent perception of HRQOL (measured by the STU) would be moderate or higher and statistically significant. The correlation between depression and parent perception of HRQOL was predicted to be negative, meaning that as depression increased, parent perception of HRQOL would decrease. The second hypothesis was tested using a bivariate correlation between the total score of the CDI and the total score of the STU.

As shown in Table 2, the bivariate correlation between the CDI and the STU was small and not statistically significant: $r = .016$, $p = .888$. This finding indicates that the analysis failed to reject the null hypothesis and may indicate that there is no significant relation between depression and parent perception of HRQOL.

Research Question 3

Research question 3 asked how the major domains of depression relate to child reported HRQOL and parent perceived HRQOL in children who are overweight or obese. Hypothesis 3a was that the correlation between major domains of depression (measured by the CDI subscales: negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem) and child reported HRQOL (measured by the SMU) would be moderate or higher and statistically significant. Likewise, hypothesis 3b was that the correlation between major domains of depression (measured by the CDI subscales) and parent perceived HRQOL (measured by the STU) would be moderate or higher and statistically significant. All relations were predicted to be negative, meaning as the major domains of depression increase, child reported HRQOL and parent perception of HRQOL would decrease.

The bivariate correlations between the subscales of the CDI and the total score of the SMU had varying levels of magnitude and statistical significance, shown in Table 3. The bivariate correlation between the negative mood subscale and the SMU was small, negative, and not statistically significant. The bivariate correlation between the interpersonal problems subscale and the SMU was small, negative, and statistically significant. The bivariate correlation between the ineffectiveness subscale and the SMU was small, negative, and not statistically significant. The bivariate correlation between the anhedonia subscale and the SMU was moderate, negative, and statistically significant. Finally, the bivariate correlation between the negative self-esteem subscale and the SMU was small, negative, and statistically significant. These findings indicate that there may be no significant relation between the variables of negative mood and ineffectiveness with child reported HRQOL, while there is a significant

relation between the variables of interpersonal problems, anhedonia, and negative self-esteem with child reported HRQOL.

None of the correlations between the subscales of the CDI and the total score of the STU were statistically significant, shown in Table 4. These findings indicate that the analysis failed to reject the null hypothesis and may indicate that there is no significant relation between negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem with perception of HRQOL. One possible explanation of this is that parent's may not fully understand how their children perceives or expresses their depression.

Table 3

Correlation of CDI subscales and the SMU

		Negative Mood	Interpersonal Problems	Ineffectiveness	Anhedonia	Negative Self-Esteem
SMU Total	Pearson Correlation	-.139	-.260	-.200	-.301	-.261
	p	.235	.024	.085	.009	.024
	N	75	75	75	75	75

Table 4

Correlation of CDI subscales and the STU

		Negative Mood	Interpersonal Problems	Ineffectiveness	Anhedonia	Negative Self-Esteem
STU Total	Pearson Correlation	.059	.040	.027	-.157	.162
	p	.612	.735	.814	.176	.163
	N	76	76	76	76	76

Research Question 4

Research question 4 asked how the major domains of child reported HRQOL and parent perception of HRQOL relate to depression. Hypothesis 4a was that the correlation between major domains of child reported HRQOL (measured by the SMU subscales: emotional, physical, teasing/marginalization, positive attributes, and social avoidance) and depression (measured by the CDI) would be moderate or higher and statistically significant. Likewise, hypothesis 4b was that the correlation between major domains of parent perceived HRQOL (measured by the STU subscales: emotional, physical, teasing/marginalization, positive attributes, mealtime, and school) and depression (measured by the CDI) would be moderate or higher and statistically significant. All relations were predicted to be negative, meaning as the major domains of child reported HRQOL and parent perception of HRQOL increase, depression would decrease.

The bivariate correlations between the subscales of the SMU and the total score of the CDI had varying levels of magnitude and statistical significance, shown in Table 5. The bivariate correlation between the emotional subscale and the CDI was small, negative, and not statistically significant. The bivariate correlation between the physical subscale and the CDI was moderate, negative, and statistically significant. The bivariate correlation between the teasing/marginalization subscale and the CDI was small, negative, and statistically significant. The bivariate correlation between the positive attributes subscale and the CDI was small, negative, and not statistically significant. Finally, the bivariate correlation between the social avoidance subscale and the CDI was moderate, negative, and statistically significant. These findings indicate that there is no significant relation between the variables of emotion and

positive attributes with depression, while there is a significant relation between the variables of physicality, teasing/marginalization, and social avoidance with depression.

None of the correlations between the subscales of the STU and the total score of the CDI were statistically significant, shown in Table 6. These findings indicate that there is no significant relation between parent's perception of their children's emotion, physicality, teasing/marginalization, positive attributes, mealtime behaviors, and school behaviors with depression.

Table 5

Correlation of the SMU subscales and the CDI

		Emotional	Physical	Teasing	Positive Attributes	Social Avoidance
CDI Total	Pearson Correlation	-.040	-.322	-.240	-.008	-.347
	p	.731	.005	.038	.942	.002
	N	75	75	75	75	75

Table 6

Correlation of the STU subscales and the CDI

		Emotional	Physical	Teasing	Positive Attributes	Mealtime	School
CDI Total	Pearson Correlation	.082	.028	-.107	.043	-.095	-.092
	p	.479	.811	.357	.712	.414	.432
	N	76	76	76	76	76	76

Research Question 5

Research question 5 asked if there were gender differences in the level of depressive symptoms or in child reported HRQOL for overweight or obese children. Hypothesis 5a was that the rates of depression (measured by the CDI) would not differ based on gender. Likewise, hypothesis 5b was that the rates of child reported HRQOL (measured by the SMU) would not differ based on gender. The groups were separated by gender and the hypotheses were tested using independent sample *t*-tests. The means of the two groups were tested for significant differences which is categorized as $p = <.20$.

An independent samples *t*-test was conducted to compare CDI total scores across gender groups. There was not a significant difference in the scores on the CDI for females, $M = 11.72$, $SD = 8.82$ and males, $M = 11.56$, $SD = 8.57$; $t = .081$, $p = .936$. This finding indicates that there was no significant difference between the rates of depression across the sex for children in this sample who are overweight or obese. The results are displayed in Table 7.

An independent samples t-test was conducted to compare SMU total scores across gender groups. There was not a significant difference in the scores on the SMU for females, $M = 70.95$, $SD = 13.67$ and males, M 70.63, $SD = 16.41$; $t = .095$, $p = .925$. This finding indicates that there is no significant difference between the rates of child reported HRQOL across gender in children who are overweight or obese. The results are displayed in Table 7.

Table 7

CDI Scores Across Gender

	Sex	*N*	Mean	Std. Deviation
CDI Total	Female	43	11.720	8.822
	Male	34	11.560	8.575

Independent Samples Test for CDI Across Gender

	t	*df*	*p*	Mean Difference
CDI Total	.081	75	.936	.162

SMU Scores Across Gender

	Sex	*N*	Mean	Std. Deviation
SMU Total	Female	42	70.959	13.670
	Male	34	70.632	16.416

Independent Samples Test for SMU Across Gender

	t	*df*	*p*	Mean Difference
SMU Total	.095	74	.925	.326

Research Question 6

Research question 6 asked what the relation between depression, child reported HRQOL, and parent perception of HRQOL is when controlling for BMI. The sixth hypothesis was tested by using a partial correlation in which BMI was controlled. Hypothesis 6a predicted that this partial correlation would be weaker than the correlation between depression (measured by the CDI) and child reported HRQOL (measured by the SMU) when BMI was not controlled. Likewise, hypothesis 6b predicted that a partial correlation between depression and parent perception of HRQOL (measured by the STU) would be weaker than the correlation between depression and parent perception of HRQOL when BMI is not controlled. Both partial correlations were expected to be negative, meaning as depression increased child reported HRQOL and parent perception of HRQOL decreased. The correlation coefficient is displayed in Pearson r.

The partial correlation between the CDI and the SMU when BMI was controlled was moderate, statistically significant, and negative, pr = -.33, p = .007. This correlation coefficient was larger than that of the correlation when BMI was not controlled (r = -.285, p = .013). While there is no test to determine if there is a significant difference between these two correlation coefficients, it does suggest that higher BMI's are not associated with an increased relation between child reported HRQOL and depressive symptoms. These results are displayed in Table 8.

The partial correlation between the CDI and the STU when BMI was controlled was not statistically significant, pr = .052, p = .676. This correlation coefficient was larger than that of the correlation when BMI was not controlled (r = .016, p = .888.). This finding suggests that

higher BMI's are not associated with an increased relation between parent perception of HRQOL and depressive symptoms. However, since neither correlation coefficient was significant, it indicates that there is no relationship between depression and parent perception of HRQOL. These results are displayed in Table 9.

Table 8

Partial Correlation between CDI and SMU controlling BMI

Control Variables			CDI Total
BMI Controlled	SMU Total	Correlation	-.330
		p	.007
		df	63
No Control	SMU Total	Correlation	-.285
		p	.013
		N	75

Table 9

Partial Correlation between CDI and STU controlling BMI

Control Variables			CDI Total
BMI Controlled	STU Total	Correlation	.052
		p	.676
		df	64
No Control	STU Total	Correlation	.016
		p	.888
		N	76

Research Question 7

Research question 7 asked how parental stress affects child reported HRQOL and parent perception of HRQOL. Hypothesis 7a was that parental stress would have no significant relation with child reported HRQOL but would have a significant relation with parent perception of HRQOL. Hypothesis 7b was that these two relations would differ to a statistically significant degree.

The symbols in the models for the current study follow the typical standards for those used in path analysis. The variables enclosed in rectangles are measured items. The smaller circles, labeled e1 and e2 are latent variables and represent disturbances, or all other influences on the outcomes other than those used in the model. The straight arrows between the measured variables reflect the proposed influence of one variable to another.

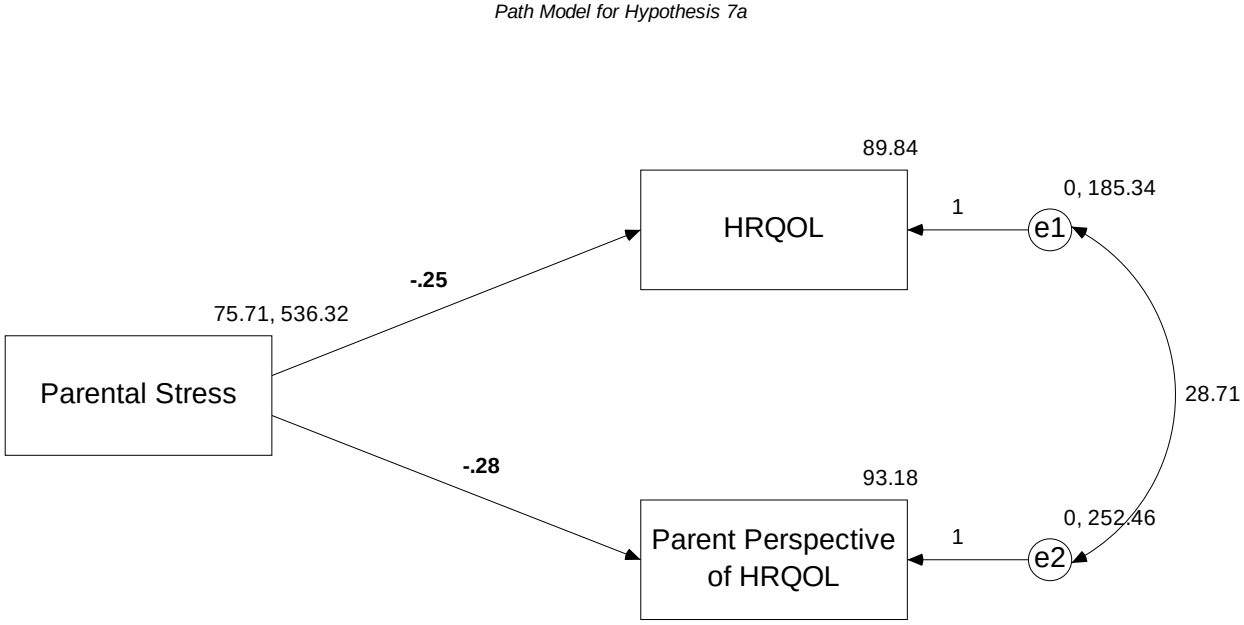
Research question 7a used a path analysis to determine the relative relationss of parental stress on child reported HRQOL and parent's perception of HRQOL. This model will be referred to as the full model. Research question 7b was conducted by constraining the two paths to be equal and determining if this constraint resulted in a statistically significant chi-square (χ^2), a measure of the fit of the model. This model will be referred to as the equal paths model.

The full model, as shown in Figure 1, demonstrated significant negative relations from parental stress to both child reported HRQOL and parent perception of HRQOL. The path from parental stress to child reported HRQOL was a significant direct relation of -.247, p = <.001. This unstandardized estimate means that for each 1 unit increase in the PSI, there is a .247 unit decrease in the SMU, other things being equal. The path from parental stress to parent perception of HRQOL was a significant direct relation of -.278, p = <.001. This unstandardized

estimate means that for each 1 unit increase in the PSI, there is a .278 unit decrease in STU. These results indicate that increased parental stress is significantly related to lower child reported HRQOL and lower parent's perception of their children's HRQOL.

To test hypothesis 7b an equal paths model was constructed in which the paths were constrained to be equal and measuring if there is a significant difference in the model fit ($\Delta\chi^2$) between the two models. This resulted in a $\Delta\chi^2$ that was not significantly different from the initial path model ($\Delta\chi^2 = .1$, $\Delta df = 1$, $p = .75$). This finding suggests that the paths on the full model are not significantly different from each other, and that parental stress, as measured by the PSI, has an equally deleterious relation with both child HRQOL and parent's perceptions of their child's HRQOL.

Figure 1



Note. Both paths were statistically significant.

Chapter V: Discussion

This study investigated the relation between Health Related Quality of Life (HRQOL), depression, and parental stress in children who are overweight or obese. The study aimed to expand on research in the area as well as develop new insights into how these variables relate to one another.

Summary of Results

There were seven main hypotheses: (1) depression would be related to child reported HRQOL, (2) depression would be related to parent's perception of HRQOL, (3) the major domains of depression would be related to child reported HRQOL and parent's perception of HRQOL (4) the major domains of child reported HRQOL and parent's perception of HRQOL would be related to depression, (5) the rates of depression and child reported HRQOL would not differ between boys and girls, (6) BMI would have a significant relation to child reported HRQOL and parent's perception of HRQOL, (7) parental stress would be related to child reported HRQOL and parent's perception of HRQOL but would have a significantly stronger relation to parent's perception of HRQOL.

Results for the main analyses provided several significant findings. First, results demonstrated that the relation between depressive symptoms and child reported HRQOL was significant. Though the relationship was not as strong as predicted, as expected there was small and significant negative correlation between depressive symptoms and child reported HRQOL, meaning as depressive symptoms increased child reported HRQOL decreased. Contrary to the hypothesis, the results indicated no significant relation between depressive symptoms and parent's perception of their child's HRQOL.

When broken down by major depressive domains, the relation between depressive symptoms and the child's report of HRQOL varied. Depressive domains of interpersonal problems, anhedonia, and negative self-esteem were all significant and negatively related to the child's report of HRQOL. The depressive domains of negative mood and ineffectiveness were not significantly related to the child's report of HRQOL. The results indicated that there was no significant relation between any of the depressive domains with parent's perception of HRQOL.

Similar results were found when looking at the relation between the major domains of child reported HRQOL and depressive symptoms. The significance in the relations varied from domain to domain. The results indicated that the HRQOL domains of physicality, teasing/marginalization, and social avoidance were both significantly and negatively related to depressive symptoms. However, the results showed that HRQOL domains of emotionality and positive attributes had no significant relation to depressive symptoms. None of the domains of parent's perception of HRQOL had a significant relation with depressive symptoms.

As predicted, the results indicate that there were no significant gender differences regarding depressive symptoms. Likewise, there were no significant gender differences regarding child reported HRQOL of life, as was predicted in the hypothesis.

The results indicate that higher BMI was not associated with an increased relation between child reported HRQOL and depressive symptoms. Likewise, the results show that higher BMI also was not associated with an increased relation between parent's perception of HRQOL and depressive symptoms.

Finally, as predicted, the research indicated that parental stress was significantly and negatively related to child reported HRQOL. Likewise, parental stress was also significantly and

negatively related to parent's perception of HRQOL. However, contrary to the hypothesis the effect that parental stress has on the child's report of HRQOL is not significantly different from the effect that parental stress has on parent's perception of HRQOL.

Overview of Key Findings

Relation between Depression and HRQOL

Depression and child reported HRQOL had a small but significant negative relation with each other when total scores were measured. While no causal relation can be made from the analyses, this information may help to predict depressive symptoms or child reported HRQOL scores, in the sense that as one score increases it could be predicted that the other score would decrease. This relation is an important change in the way that these two measures are conceptualized, since it indicates that measurements of health related wellness are related to measurements of depressive symptomology. This result also adds a novel piece to the literature in the area. Since literature in this area is limited, it may be important for future research to continue to develop our understanding of the relation between depressive symptoms and HRQOL in children who are overweight or obese and help to corroborate the findings of this study. Furthermore, the relation between depression and HRQOL may indicate an importance of targeting both the emotional distress the child is feeling and the functional impact that the child's obesity has on their quality of life through clinical interventions. Clinically, this information may help to improve efficacy of treatment and cover a more comprehensive area of concern for children and adolescents who are overweight and obese. At this time, clinical treatment outcoes have not been tested, but would be an important next step in applying research to direct practice.

In regards to the relation between specific domains of depression and child reported HRQOL, the results are more varied. The domains of interpersonal problems, anhedonia, and negative self-esteem were found to have a significant relation to child reported HRQOL. However, negative mood and ineffectiveness did not have a significant relation to child reported HRQOL. When looking at the relation between depressive symptoms and specific domains of HRQOL, the results are also varied. The domains of physicality, teasing/marginalization, and social avoidance were found to have a significant relation to depressive symptoms. However, the domains of emotionality and positive attributes did not have a significant relation to depressive symptoms. Current theory or research is not available to explain why the various domains had varying results, though one possible interpretation may be that children who are overweight or obese have low emotional functioning and low positive regard for their body regardless of whether or not they are depressed. However, it would be beneficial for future research to replicate this study's results as well as to develop an understanding of why certain domains of depression and HRQOL were less related than others. Application of this knowledge to clinical practice is also important. Treatment of the most important domains may be an important step in creating an efficacious treatment for emotional distress and functional problems in children and adolescents who are overweight or obese. It would be beneficial to focus future research on finding the clinical outcomes when treatment focuses on the domains that have been found to be most pertinent to this population.

The relation between depressive symptoms and HRQOL is important since there is some evidence to suggest that overweight or obese children may have increased rates of depression (Zeller et al., 2004), making emphasis on depression important to consider in practice. Mental

health professionals have used symptomology measures to detect and monitor depressive symptoms for many years, however, those measures lack flexibility, do not gauge wellness, do not allow for condition-specific measurement, and lack research on the psychometric properties with an overweight or obese population (Zeller & Modi, 2008). Increased use of HRQOL measures may help to alleviate some of these measurement concerns, and with the results of this study finding a relation between depressive symptoms and HRQOL, it may be possible to better predict how one's depressive symptoms may change as HRQOL changes and vice versa. Furthermore, this knowledge could help clinicians to develop and implement better treatment for emotional distress and functional impairment for children and adolescents who are overweight or obese.

Relation between Depression and Parent's Perception of HRQOL

Depression and parent's perception of HRQOL had no significant relation to one another when total scores were measured. This indicates that depression scores may be independent from parent's perception of HRQOL and vice versa. While the results indicate that depressive scores are independent from parent's perception of HRQOL and vice versa, it is still an important piece of information when selecting measures for use. Measuring the parent's perception of HRQOL may be a helpful way of gathering data from a parent's point of view on condition-specific wellness (Zeller & Modi, 2008), though depression and parent's perception of HRQOL may be independent of one another. One possible interpretation to why child reported HRQOL is related to depressive symptoms but parent's perception of HRQOL is not is that parents and their children may have differing opinions on what they consider high HRQOL. Research has shown that even though the level of parent-child agreement is generally high,

children often report better HRQOL than their parents do, especially when that child has mental health problems (Dey, Landolt, & Mohler-Kuo, 2013). Despite the fact that there is no relation between depression and parent's perception of HRQOL, there are still clinical implications present from this information. It may help to inform treatment showing a need for psycho-education about how their children are perceiving their own HRQOL, and how to help their children with these challenges.

In regards to the relation between specific domains of depression and parent's perception of HRQOL there was again no significant relation found. None of the domains including; negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem had any significant relation with parent's perception of HRQOL. When looking at the relation between depressive symptoms and specific domains of parent's perception of HRQOL, the results again indicate that there are no significant relations. For each of the domains of parent's perception of HRQOL, including; emotional, physical, teasing/marginalization, positive attributes, mealtime, and school there was no significant relation with depressive symptoms. Though the results cannot determine why there is no relation, they do indicate that all of the domains of depression are independent of parent's perception of HRQOL, and likewise all of the domains of parent's perception of HRQOL are independent of depressive scores. The results of this study clearly suggest that there is no relation between depressive symptoms and parent's perception of HRQOL. Again, this could be interpreted by research that indicates parent-child agreement on HRQOL is generally high, but that children often report higher HRQOL than their parents and it is agreement is particularly weaker in children with mental health problems (Dey, Landolt, & Mohler-Kuo, 2013). However, it would be beneficial for future research to focus on

replication of these findings since there is limited literature and theory in this particular area of study. Although the research shows that there is no relation between particular domains, clinical information can still be gathered. It may highlight the importance of psycho-education for parents in understanding why these particular domains are important to their children's health and wellbeing, as well as learning techniques to help their children with concerns in those areas.

Though the research indicates that there is no relation between depressive symptoms and parent's perception of HRQOL, there is still practical information that can be interpreted. The first being that the results indicate that depression and parent's perception of HRQOL are independent of one another. Further research would be required to determine why parent's perception of HRQOL had no relation to depressive symptoms while child reported HRQOL did. Emphasis on this may be important to help develop understanding about parent perception of HRQOL and how its measurement can be utilized clinically.

Despite the lack of relation, each measure still merits value in monitoring symptomology and wellness in children who are overweight or obese. Measuring depressive symptomology has been shown to be a valid source of measurement (Kovacs, 1982), and measuring parental perception of HRQOL has been shown to measure a broad spectrum of health (Schipper, et al., 1996), have flexibility in measurement, allow for condition-specific measurement, and have research available on the psychometric properties in an overweight or obese population (Zeller & Modi, 2008). This means that previous literature and the results of this study show that measurement of depressive symptoms and parent's perception of HRQOL are important in monitoring mental health and wellness in children who are overweight or obese, but may be independent of one another.

The Role of Gender on Depression and HRQOL

There were no significant differences regarding depressive symptoms across gender. As predicted, both boys and girls had similar rates of depressive symptoms. These findings can be corroborated with previous literature that shows rates of depression in children who are overweight or obese tend to have no gender differences (Zeller et al., 2004). However, rates of depression in adolescents who are overweight or obese are higher for girls than boys (Anderson et al., 2006; Blaine, 2008; Hillman, Dorn, & Huang, 2010). This is similar to the general population, since research has shown that in childhood there are no gender differences related to depression, but that following puberty girls tend to have higher rates of depression than boys (Mezulis et al., 2010). These studies results indicate there are no gender differences in children who are overweight or obese in regards to depressive symptoms supports the previous literature on the subject. The results are helping to develop understanding on how to conceptualize depression in children who are overweight or obese based on gender. However, emphasis on understanding why female children who are overweight or obese experience similar rates of depression in childhood but diverge into increased rates of depression in adolescence would be beneficial to conceptualizing gender differences in this population. One possible area of research would be to divide groups into pre and post puberty, since often girls who are overweight or obese reach puberty sooner. This would help determine the significance of puberty as a psychophysiological trigger that may increase the risk of depression in girls. Clinically, this information can be used to show that children in the childhood age range have similar concerns in regard to depression, and developmentally appropriate clinical intervention may benefit by targeting the same areas for both boys and girls.

Similarly, there were no significant differences regarding child reported HRQOL across gender. As predicted, both boys and girls had similar rates of child reported HRQOL. Previous research shows that HRQOL is generally lower in adolescent girls who are overweight or obese compared to boys (Williams et al., 2011; Keating et al., 2011, Al-Akour et al, 2012). The same can be shown in adults, as women who are overweight or obese tend to have lower rates of HRQOL than men (Cameron et al., 2012). While this research shows support for gender differences in adolescents and adults, there is no literature related to gender differences regarding HRQOL in children who are overweight or obese. The results of this study indicate that children do not have gender differences regarding child reported HRQOL in childhood, but that gender differences appear when entering adolescence. It would be beneficial for future research to try and replicate these results since there is limited information on the subject. Likewise, it will be important for future research to develop understanding as to why female children share similar rates of HRQOL with males, but have an increased risk of lower HRQOL when they reach adolescence. Clinically, this information can be used to show that children in the childhood age range have similar concerns in regard to depression, and developmentally appropriate clinical intervention may benefit by targeting the same areas for both boys and girls.

The Role of BMI

Results show that higher BMI is not associated with an increased relation between depressive symptoms and child reported HRQOL. There is some evidence to suggest that higher BMI is associated with higher rates of depressive symptoms (Zeller et al., 2004). Likewise, there is evidence to suggest that higher BMI is associated with lower rates of HRQOL (Renzaho et al., 2010; Haraldstad et al., 2011; Zeller et al., 2006). Results from this study indicate that there is a

relation between depressive symptoms and child reported HRQOL; however, the results of this study also show that controlling for BMI does not improve the relation between depressive symptoms and child reported HRQOL in children who are overweight or obese. One limitation to this result is that the population used in the study has BMIs that are only in the overweight or obese range, so these findings cannot be generalized to include children outside of this range. However, this result indicates that depressive symptoms and child reported HRQOL have the same strength of relation no matter their BMI. This may help clinicians to conceptualize and develop treatment plans for children with weight related health and wellness concerns by emphasizing both emotional distress and functional impairment regardless of the child's BMI. Future research could expand on the current study's findings by including people below the overweight BMI range to determine if depressive symptoms and HRQOL have the same relation across all BMI ranges.

Similarly, results show that controlling for BMI does not change the relation between depressive symptoms and parent's perception of HRQOL. Though there was no significant relation between depression and parent's perception of HRQOL, this result can add to the findings by showing that no matter what the child's BMI is, depression and parent's perception of HRQOL remained uncorrelated.

The Role of Parental Stress on HRQOL

Parental stress plays an essential role in the model tested in this study. The results indicate that parental stress was significantly and negatively related to child reported HRQOL. This finding is supported by previous research that shows that parenting stress was an indicator of poorer health and wellness outcomes (Helgeson et al., 2012, Cushner-Weinstein et al., 2008;

Mullins et al., 2007; Ohleyer et al., 2007). Literature shows, family stress plays an important role in the developmental context of children who are overweight or obese (Lachal et al., 2012). Likewise, parental and family stress is higher in families with children who have chronic health problems (Chiou & Hsieh, 2008; Streisand et al., 2003), making parental stress an important factor to consider in conceptualizing children who are overweight or obese and their families. The results of this study add to previous literature and suggest that for children with chronic health conditions such as obesity, the presence of stress in a parent may put the children at risk for worse health outcomes. Further research is needed to determine how parental stress relates to specific domains of HRQOL. This would be an ideal future step for the research in this area, and would help to pave the way to implementing treatment for parental stress with the focus of improving health and wellness of children who are overweight or obese.

Results also indicate that parental stress was significantly and negatively related to parent's perception of HRQOL. There is specific literature regarding how parental stress affects parent's perception of HRQOL. Previous research shows that clinical levels of parental stress predicted lower scores on parent's perception of their child's HRQOL (Guilfoyle, et al., 2010). As mentioned previously, parents of children who are overweight or obese also experienced greater levels of parental stress (Chiou & Hsieh, 2008; Streisand et al., 2003), and those children tend to be at greater risk for poor health and wellness outcomes (Helgeson et al., 2012, Cushner-Weinstein et al., 2008; Mullins et al., 2007; Ohleyer et al., 2007). Since parental stress has a significant impact on parent perception of HRQOL and previous research shows that it is related to health and wellness outcomes, parental stress should be emphasized as an important and significant factor to consider when conceptualizing children who are overweight or obese and

their families. Future research should have an emphasis on determining specifically how parental stress affects parent's perception of HRQOL in order to determine appropriate areas for improvement when targeting health and wellness outcomes.

The relation that parental stress has with child reported HRQOL and parental stress has with parent's perception of HRQOL did not significantly differ. Though child reported HRQOL and parent perception of HRQOL are conceptually similar, there was evidence to suggest that parental stress effected parent perception of HRQOL (Guilfoyle, et al., 2010) however; no information was available on the relation between parental stress and child reported HRQOL. Since this previous literature was available and it was thought that parent focused measures would be more closely related, it was expected that the relation between parental stress and parent's perception of HRQOL would be significantly stronger than the relation between parental stress and child reported HRQOL. However, the results suggest that the relation between parental stress and both child reported HRQOL and parent perception of HRQOL were statistically equal. While the available literature focuses on the effect of parental stress on parent perception of HRQOL (Guilfoyle, et al., 2010), it seems that it does not relate to it more than the child's report of HRQOL. The results of this study show that parental stress has a significant relationship with child reported HRQOL and parent's perception of HRQOL; furthermore, parental stress has a statistically equal relation with both variables.

General Limitations

There are several limitations to consider for the current study. First, the use of an ongoing data collection prevented the study from having a completed data set. The total number of children that has already participated and those that will agree to participate in the researches

intervention program is larger than what was used in this study. The timing of this study prevented the use of a larger sample size which would have attributed to great power for each analysis. While the sample size was adequate for most of the analyses, a power analysis has shown that there is a small sample size for using independent samples *t*-tests regarding gender differences in depressive symptoms and child reported HRQOL scores. There is previous research to support the results that were found in this study related to gender differences in depression. One study has shown that there were no significant gender differences related to depression in children who are overweight or obese (Zeller et al., 2004), however, there is no literature available related to gender differences in HRQOL for children who are overweight or obese. Based on the results of this study it is unlikely that having a larger sample size would have indicated significant gender differences in either depressive symptoms or child reported HRQOL, however, it may be important for future researchers to rerun this analysis with the completed data set to utilize adequate power.

The dataset used in the current study comes from an intervention program where inclusion criteria include an age range of 5 to 12 years. Any participants that were younger or older than this range and participated in the intervention were excluded from the data analyses. Since these participants were excluded, it is not possible to generalize the findings of this study to other age ranges. It should be noted that one of the primary purposes of the study was to gather research regarding children of this age range to help complete literature for this developmental period. However, it is important to understand the age differences for people who are overweight or obese in regards to their relation with depressive symptoms and HRQOL. Previous literature can be used to help understand the differences between children and

adolescents who are overweight or obese regarding their relation with depressive symptoms and HRQOL. Some studies show that adolescents that are overweight or obese have an increased risk for depression as well as HRQOL (Anderson et al., 2007; Zeller et al. 2006). Future studies could focus on why the children's relation with depression and HRQOL change over time.

Another limitation to the sample is that there is no ethnicity data recorded. This makes it impossible to understand the ethnic or cultural significance of the results. Furthermore, data cannot differentiate between ethnicities, meaning that this data cannot detect how specific groups may differ from each other. In previous research ethnicity was shown to be a significant factor in the relation between depression and obesity (Anderson et al., 2007; Zeller et al. 2006). Future data collection should include this variable to increase the amount of meaningful research questions that can be answered.

Likewise, an inclusion criterion for the program is a BMI in the overweight or obese range. Since the dataset did not include children with a BMI in the normal or underweight categories, it is not possible to generalize the findings of this study to other BMI ranges. Though one of the primary purposes of the study was to develop research regarding children who are overweight or obese, it may be helpful for future researchers to consider including children in other BMI categories in order to understand how children who are overweight or obese compare to other children. This is specifically noted in analyzing the role that BMI plays in the strength of the relationship between depressive symptoms, child reported HRQOL, and parent's perception of HRQOL. The partial correlation showed that BMI was not a factor in the strength of the relationship between depressive symptoms and child reported HRQOL or depressive symptoms and parent's perception of HRQOL for children who are within the overweight or

obese BMI category. However, future research should emphasize the comparison between all BMI categories to determine if depressive symptoms, child reported HRQOL, and parent's perception of HRQOL are related differently across all BMI ranges, or if the relation similar to the findings in the overweight and obese range of BMI.

When considering the results for research questions involving parents, it is important to consider that the majority of the responders on the measures were from the mothers of the children participating, with relatively few fathers responding to measures. This creates problems in generalizing findings about other types of caregiver (e.g. fathers, grandparents, or other caregivers). Although this study lacks adequate representation of fathers or other types of caregivers in the sample, there is research available that can help support the findings of this study across the type of caregiver. Research shows that higher levels of life stress was a predictor of poorer health and wellness outcomes for children regardless of which parent reported (Helgeson et al., 2012). Likewise, higher levels of parental stress predicted lower levels of parent's perception of HRQOL across type of caregiver (Guilfoyle, et al., 2010). Previous research supports the idea that parental stress in both mothers and fathers is a predictor of negative health and wellness reports and outcomes; however, it is not surprising that the majority of parental involvement in the intervention program that produced the dataset for the current study was from the mothers. Previous literature shows that rates of parental stress is significantly higher for mothers than it is for fathers when caring for children who are overweight or obese (Zeller et al., 2007). Similarly, research shows that maternal parenting stress is highly correlated with seeking out treatment and completing treatment programs (Epstein et al., 2000; Zeller et al., 2004b). In order to better generalize findings for parents, it

will be important to emphasize using an adequate sample of fathers, as well as other types of caregivers, in future research.

Lastly, the current study uses cross sectional data, and causal inferences cannot be made based on this research alone. The use of longitudinal data may help to better understand causal inferences. Specifically regarding how parental stress effects child reported HRQOL and parent's perception of HRQOL. There is some previous research indicating that parental stress has a causal relation with parent's perception of HRQOL (Guilfoyle, et al., 2010). However, the same cannot be said for the relation between parental stress and child reported HRQOL, as there is no literature describing the nature of their relation. Further research is needed to test what effects parental stress has on child reported HRQOL and parent's perceptions of HRQOL over time.

Implications

Despite the aforementioned limitations, the findings from this study contribute useful information to the understanding of the relation between depressive symptoms; child and parent reported HRQOL, and parenting stress for children who are overweight or obese. This information can be used to inform future studies as well as clinical practice. Implications for future research and clinical care are discussed in light of the limits to this particular study.

Future Research

There are several directions for future research to better understand the relation between depression, HRQOL, and parental stress. Perhaps the most obvious direction for future research is to measure depression, HRQOL, and parental stress in obesity treatment programs. The current study only evaluates participants at a pre-treatment time point, which limits the

interpretations of results and doesn't allow for measuring change. Looking at these constructs at pre and post treatment time points would be helpful in looking at change as BMI improves. This could also be helpful in determining how malleable child reported HRQOL and parent's perception of HRQOL is based on the weight management intervention.

Likewise, it would be interesting to explore the relation between depressive symptoms, HRQOL, and parental stress longitudinally across time. It would be helpful to develop understanding about how the relation between depressive symptoms, HRQOL, and parental stress change over time and across developmental periods. This would provide researchers and clinicians with more information about how weight related health issues affect depression, HRQOL, and parental stress as well as how these variables relation changes across time. Specifically, it could demonstrate whether the relation between depressive symptoms, HRQOL, and parental stress are stable across time.

Another area of research to consider would be by expanding the demographic to include children in all BMI categories. The current study includes those that are in the overweight category or higher, however, it may be important to include those that are in a healthy weight or even an underweight category. While these categories are conceptually different, this could help determine if the relation between depressive symptoms, (non-obesity specific) HRQOL, and parental stress is unique to those individuals who have weight related health problems or if that relation is stable across BMI.

A final area of future research would be to explore why some specific domains of depression were significantly related to HRQOL while others were not. Likewise, it would be interesting to explore why some specific domains of HRQOL were significantly related to

depressive symptoms while other domains were not. The current study found that overall scores for depression and child reported HRQOL were significantly related, yet there was variation in how some of the specific domains of each variable were related. First, replication of this study's results would be important to determine that the relation of each specific domain is accurate. Furthermore, development of theory behind why certain domains of child reported HRQOL (physical attributes, teasing/marginalization, and social avoidance) were significantly related to depression and others (emotionality and positive traits) were not significantly related would help clinicians to hone in on factors that are important to consider when treating children who are overweight or obese.

Clinical Practice

The current study provided relevant information to consider for future clinical practice regarding depressive symptoms, HRQOL, and parental stress in an overweight and obese child population. As previously mentioned, the results reinforce the importance of HRQOL as an important construct to measure. It is related to depression, a common mental health concern in children who are overweight or obese but also has some properties that appear to be independent of depression and its relation to depression is different depending on reporter, making it important to measure both. It may also be helpful to gauge HRQOL in treatment since there are several measurement benefits to using a condition-specific wellness measure such as looking beyond internal distress to gauge how the condition functionally impacts the child, which cannot be done by using a symptomology measure alone. Likewise, it may be important to begin targeting improvement of HRQOL in treatment. Since, depressive symptoms and HRQOL are significantly related it is possible that targeting improvement of HRQOL may also indirectly

help to reduce depressive symptoms. Specifically, this information indicates that they Healthy Living, Happy Living would benefit from its continued use of HRQOL measures. This program currently measures pre and post intervention data, but may benefit from HRQOL data at the mid-point of the treatment to help adjust for any needs of the children involved.

When looking at treatment at the family level, improvement of parental stress may be an important area to focus on when treating children who are overweight or obese. The results show that both the children and parents perceive higher levels of HRQOL when lower levels of parental stress are reported. Targeting improvement of parental stress in treatment may be helpful in improving HRQOL outcomes. Specifically, the Healthy Living, Happy Living program may benefit from its continued use of measuring parental stress. The program may benefit from using parental stress measures as a way to target specific areas for intervention on the individual family level.

This study also helps clinicians in their conceptualization of children who are overweight or obese. The results of this study show that in children who are overweight or obese there are no significant differences in depressive symptoms or HRQOL based on gender. This means that boys and girls can be conceptualized similarly regarding risks for depression and HRQOL. Likewise, depressive symptoms, child reported HRQOL, and parent's perception of HRQOL were equally related across BMI. This means that overweight and obese children may have similar relations between depressive symptoms, child reported HRQOL, and parent's perception of HRQOL regardless of the severity of their obesity.

Conclusions

The primary goal for this study was to investigate the relation between depressive symptoms, HRQOL, and parental stress in children who are overweight or obese. This study also analyzed how these variables related to gender and BMI. Furthermore, the study determined what relation parental stress has with child reported HRQOL and parent's perception of HRQOL. Analyses provided several significant findings, including a significant relation between depressive symptoms and child reported HRQOL as well as parental stress having a significant relation with child reported HRQOL and parent's perception of HRQOL. While other findings were not statistically significant, their implications are nevertheless important, including findings that indicate that there is no significant relation between depressive symptoms and parent's perception of HRQOL, there are no significant gender differences for depressive symptoms or HRQOL, and that the relation between depressive symptoms and HRQOL was statistically similar regardless of the child's BMI. These findings have implications for continued research and future clinical practice.

The current study is relevant to the conceptualization, measurement, and treatment of children who are overweight or obese. Results provide further support that for the importance of measurement of depression, HRQOL, and parental stress in children who are overweight or obese. Current findings support previous research that highlights the importance of depression and HRQOL in overweight or obese youth (Anderson et al., 2007; Zeller et al., 2006). Likewise, current findings confirm previous research regarding the effect that parental stress has on parent's perception of HRQOL (Guilfoyle, et al., 2010) and adds to that literature by showing that parental stress also has a significant relation with the child's perception of HRQOL. It is possible that the results of this study would become more relevant if data is collected

longitudinally and at pre and post treatment time points to determine how the relation between depressive symptoms, HRQOL, and parental stress change over time and how treatment effects this relation. Future research is needed to further clarify these relations.

Overall, this study expanded the research base for children who are overweight or obese by providing important information about the relation between depressive symptoms, HRQOL, and parental stress. The findings of this study provided evidence to suggest an important relation between depressive symptoms and child reported HRQOL. Further results provide additional support to the critical relation that parental stress has with child reported HRQOL and parent's perception of HRQOL. These findings support the need of additional research, specifically in measurement and treatment of depression, HRQOL, and parental stress in order to better plan future treatment for children who are overweight or obese.

Appendix A: Hypotheses Correlation Matrices

Hypothesis 3a.

		HRQOL
Depression	Negative Mood	Moderate
	Ineffectiveness	Moderate
	Negative Self-Esteem	Moderate
	Anhedonia	Moderate
	Interpersonal Problems	Moderate

Hypothesis 3b.

		Parent Perspective of HRQOL
Depression	Negative Mood	Moderate
	Ineffectiveness	Moderate
	Negative Self-Esteem	Moderate
	Anhedonia	Moderate
	Interpersonal Problems	Moderate

Hypothesis 4a.

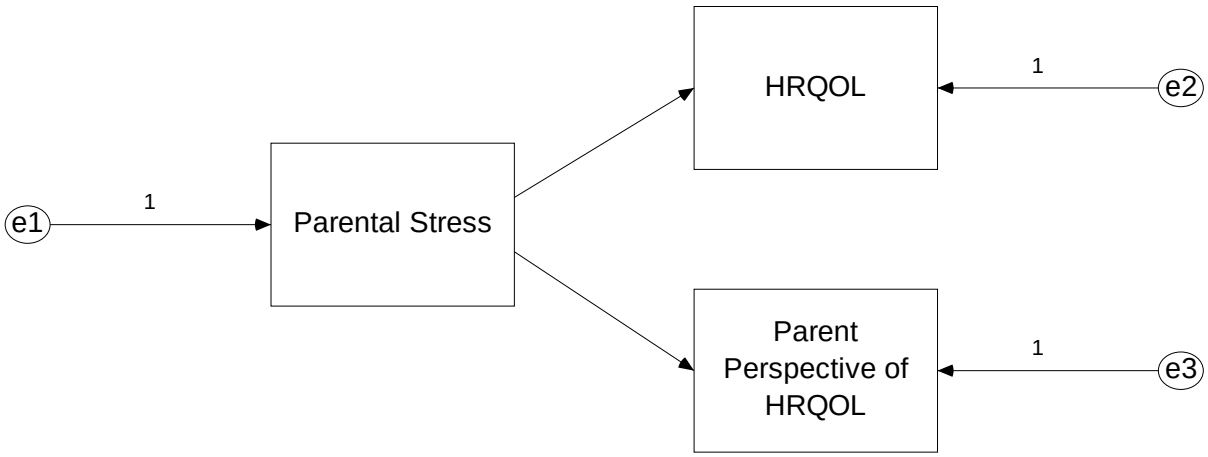
		Depression
HRQOL	Emotional Functioning	Moderate
	Physical Functioning	Moderate
	Social Avoidance	Moderate
	Positive Social Attributes	Moderate
	Teasing/Marginalization	Moderate

Hypothesis 4b.

		Depression
Parent Perception of HRQOL	Emotional Functioning	Moderate
	Physical Functioning	Moderate
	Teasing/Marginalization	Moderate
	Positive Attributes	Moderate
	Mealtime	Moderate
	School	Moderate

Appendix B: Proposed Path Model

Hypothesis 7a. and 7b.



Appendix C: Child Demographics

Language

	Frequency	Percent
English	46	57.5
Spanish	34	42.5
Total	80	100.0

Sex

	Frequency	Percent
Female	44	55.0
Male	36	45.0
Total	80	100.0

Age

	Frequency	Percent
6	8	10.0
7	7	8.8
8	19	23.8
9	10	12.5
10	15	18.8
11	17	21.3
12	4	5.0
Total	80	100.0

Appendix D: Healthy Living Happy Living Parent Letter

Dear Healthy Living Happy Living Family,

Thank you for your interest in our 10-week healthy living program. This is a program for students and families to facilitate healthy habits through physical education, nutrition education, family involvement, and behavior change/mental health. A generous grant from the Children's Medical Center Foundation allows us to offer this program to you at no cost. To participate, we **require 3 things**:

1) Clearance from your doctor. We must receive the enclosed **2-page pre-participation form** to guarantee your participation in the program. We will contact you once we receive the form to confirm your participation. We have a limited number of spots, and so if we are unable to offer you a place in the next session, we will put you on the priority list for future sessions. If your child does not have a doctor the Insure-A-Kid program can help you find one: 324-2447.

Parents/guardians complete page 1, and your doctor must review and sign page 1 as well as complete and sign page 2. Your signature on page 1 and your **doctor's signature on page 1 and 2** are required. Please make a copy of the completed form for your records, and then send the form by **fax to (512) 406-6520 or mail to**:

Dell Children's Medical Center of Central Texas
Attn: Stephanie Sauceda
Specialty Care Center, Patient Access Representative
4900 Mueller Blvd
Austin, TX 78723

2) Commitment from the **student and** their **parent/guardian** to **attend all 10 sessions**. Due to the cost of the program, we can only offer a limited number of spots. For this reason, please do not register for the program unless you can attend all 10 sessions. The program will run from 4:30-7pm on Wednesdays at Dell Children's Medical Center. Unfortunately, we are unable to provide childcare and so **only children who are official participants in the program may attend**. ***Programs are offered in both Spanish and English. Please contact us to learn about future program start dates.***

3) Student must be aged 6-11 years old and have **a body mass index (BMI) ≥85th percentile** for their age. *Your doctor can tell you if your child meets this requirement.* The Healthy Living Happy Living Program targets families with children who are already overweight, who want to live healthier, happier lives. **Please call** us at **512-324-9999 ext. 86433 with any questions.**
We look forward to meeting you!

Appendix E: Children's Depression Inventory

Children's Depression Inventory

Kids sometimes have different feelings and ideas.

This form lists the feelings and ideas in groups. From each group of three sentences, pick one that describes you **best** for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right answer or wrong answer. Just pick the sentence that best describes the way you been recently. Put a mark like this X next to your answer. Put the mark in the box next to the sentence you pick.

1. I am sad once in a while.
I am sad many times.
I am sad all the time.

2. Nothing will ever work out for me.
I am not sure if things will work out for me.
Things will work out for me O.K.

3. I do most things O.K.
I do many things wrong.
I do everything wrong.

4. I have fun in many things.
I have fun in some things.
Nothing is fun at all.

5. I am bad all the time.
I am bad many times.
I am bad once in a while.

6. I think about bad things happening to me once in a while.
I worry that bad things will happen to me.
I am sure that terrible things will happen to me.

7. I hate myself.
I do not like myself.
I like myself.

8. All bad things are my fault.

Many bad things are my fault.
Bad things are not usually my fault.

9. I do not think about killing myself.
I think about killing myself but I would not do it.
I want to kill myself

10. I feel like crying every day.
I feel like crying many days.
I feel like crying once in a while.

11. Things bother me all the time.
Things bother me many times.
Things bother me once in a while.

12. I like being with people.
I do not like being with people many times.
I do not want to be with people at all.

13. I cannot make up my mind about things.
It is hard to make up my mind about things.
I make up my mind about things easily.

14. I look O.K.
There are some bad things about my looks.
I look ugly.

15. I have to push myself all the time to do my schoolwork.
I have to push myself many times to do my schoolwork.
Doing schoolwork is not a big problem.

16. I have trouble sleeping every night.
I have trouble sleeping many nights.
I sleep pretty well.

17. I am tired once in a while.
I am tired many days.
I am tired all the time.

18. Most days I do not feel like eating.
Many days I do not feel like eating.
I eat pretty well.

19. I do not worry about aches and pains.

I worry about aches and pains many times.
I worry about aches and pains all the time.

20. I do not feel alone.
I feel alone many times.
I feel alone all the time.

21. I never have fun at school.
I have fun at school only once in a while.
I have fun at school many times.

22. I have plenty of friends.
I have some friends but I wish I had more.
I do not have any friends.

23. My schoolwork is alright.
My schoolwork is not as good as before.
I do very badly in subjects I used to be good in.

24. I can never be as good as other kids.
I can be as good as other kids if I want to.
I am just as good as other kids.

25. Nobody really loves me.
I am not sure if anybody loves me.
I am sure that somebody loves me.

26. I usually do what I am told.
I do not do what I am told most of the times.
I never do what I am told.

27. I get along with people.
I get into fights many times.
I get into fights all the time.

SIZING ME UP

SCHOOL-AGE CHILD VERSION (5-13 years)

INTERVIEWER ADMINSTERED

SUBJECT ID: _____

DATE: _____

INTERVIEWER: _____

INSTRUCTIONS: This questionnaire is formatted to be used by an interviewer and should only be administered to a child in interview format. Directions that are to be read ALOUD by the interviewer will be in *italics*. Children *11-13 years of age* may complete the measure on their own after the practice items.

Interviewer: *Now you are going to answer some questions, but first I want to go over the different answer choices with you.* (Take out Answer Choice Card). *If I asked you to pick **ALL** of the circle, which would you pick? If I asked you to pick **A lot** of the circle, which would you pick? If I asked you to pick **A little** of the circle, which would you pick? If I asked you to pick **None** of the circle, which would you pick?* Make sure child understands these concepts.

Interviewer: *We are going to be asking you some questions about some of the things that you think and feel. There are no right or wrong answers. For each question I ask you, you are going to look at this card (give child Answer Choice Card) and choose an answer. If you are not sure about your answer, just pick the one that you think is best for you.*

Let's try a practice one:

EXAMPLE: ***A library has books.***

Is that "none of the time," "a little," "a lot," or "all the time"?

Let's try another one.

EXAMPLE: ***Dogs can fly.***

Is that "none of the time," "a little," "a lot," or "all the time"?

ID:_____
DATE:_____

Please check the box that corresponds with the child's answers.

During the past month, tell us how much you:

	None of the time	A little	A lot	All the time
1. Were teased by other kids because of your size	☐	☐	☐	☐
2. Felt sad because of your size	☐	☐	☐	☐
3. Were told you are healthy or growing well	☐	☐	☐	☐
4. Felt mad because of your size	☐	☐	☐	☐
5. Felt left out because of your size (e.g. no one talks or sits with you)	☐	☐	☐	☐
6. Found it hard to swing, climb, skip, bounce a ball, or jump rope because of your size	☐	☐	☐	☐
7. Like yourself because of your size	☐	☐	☐	☐
8. Stood up for or helped other kids because of your size	☐	☐	☐	☐
9. Felt frustrated because of your size	☐	☐	☐	☐
10. Felt worried because of your size	☐	☐	☐	☐
11. Chose not to go to school because of your size	☐	☐	☐	☐
12. Had problems fitting into your desk at school because of your size	☐	☐	☐	☐
13. Felt happy because of your size	☐	☐	☐	☐
14. Were picked first for recess or gym because of your size	☐	☐	☐	☐
15. Were teased by other kids when physically active (e.g. move your body) because of your size	☐	☐	☐	☐
16. Felt you have a good sense of humor	☐	☐	☐	☐

ID:_____
DATE:_____

During the past month, tell us how much you:

	None of the time	A little	A lot	All the time
17. Did not want to go to the swimming pool or park because of your size……	☐	☐	☐	☐
18. Felt uncomfortable sleeping at a friend's house because of your size……	☐	☐	☐	☐
19. Got upset at mealtimes (e.g. cried, fussed, argued)	☐	☐	☐	☐
20. Found it hard to keep up with other kids because your size……	☐	☐	☐	☐
21. Got out of breath and had to slow down because of your size……	☐	☐	☐	☐
22. Chose not to participate in gym or recess at school because of your size ……	☐	☐	☐	☐

SIZING THEM UP
PARENT VERSION (children 5-18 years)

Understanding the impact of your child's health and treatment (e.g. exercise, diet) on their day-to-day activities can help healthcare professionals provide better treatment recommendations for you and your child. For this reason, we have developed a weight-specific quality of life measure for parents of children with obesity.

INSTRUCTIONS: The following questions are regarding your child's quality of life and your perceptions of how their weight/shape/size impacts their day to day activities. *Please answer all the questions.* There are no right or wrong answers. If you are unsure how to answer a particular question, please choose the response that seems to best fit your child's situation.

SUBJECT ID: _____
DATE: _____

Has your child been on vacation, out of school, or had any major changes (e.g. moving, starting a new school) during the past month?

☐ NO ☐ YES If yes, please explain: _____

Please indicate how your child has been feeling within the past MONTH regarding their weight/shape/size by checking the box that best fits your child.

During the past month, indicate how often your child:

	Never	Sometimes	Often	Always
1. Had difficulty participating in physical activities (e.g. sports) because of their weight/shape/size.....	☐	☐	☐	☐
2. Was teased by peers because of their weight/shape/size.....	☐	☐	☐	☐
3. Chose not to go to school because of their weight/shape/size.....	☐	☐	☐	☐
4. Felt sad because of their weight/shape/size.....	☐	☐	☐	☐
5. Had to make changes to surroundings (e.g. furniture, school desks) because of their weight/shape/size.....	☐	☐	☐	☐
6. Argued about when, what and how much to eat.....	☐	☐	☐	☐

ID:_____
DATE:_____

During the past month, indicate how often your child:

	Never	Sometimes	Often	Always
7. Chose not to participate in gym/recess/physical education at school because of their weight/shape/size.....	☐	☐	☐	☐
8. Felt frustrated because of their weight/shape/size...	☐	☐	☐	☐
9. Avoided dressing or undressing in front of others because of their weight/shape/size.....	☐	☐	☐	☐
10. Kept their body clean and fresh.....	☐	☐	☐	☐
11. Felt worried because of their weight/shape/size.....	☐	☐	☐	☐
12. Felt left out because of their weight/shape/size (e.g. no one talks or sits with them).....	☐	☐	☐	☐
13. Felt mad because of their weight/shape/size.....	☐	☐	☐	☐
14. Was teased by others when physically active because of their weight/shape/size.....	☐	☐	☐	☐
15. Seen as having a good sense of humor.....	☐	☐	☐	☐
16. Felt concerned about their weight/shape/size.....	☐	☐	☐	☐
17. Perceived as healthy by others.....	☐	☐	☐	☐
18. Became upset at mealtimes (e.g. cried, fussed, argued).....	☐	☐	☐	☐
19. Had difficulty keeping up with other children because their weight/shape/size.....	☐	☐	☐	☐
20. Felt successful in daily activities.....	☐	☐	☐	☐
21. Became out of breath and had to slow down because of their weight/shape/size.....	☐	☐	☐	☐
22. Had low self-esteem because of their weight/shape/ size.....	☐	☐	☐	☐

ID:_____
DATE:_____

For parents of children **14 years and older:**

During the past month, indicate how often your child:

	Never	Sometimes	Often	Always
23. Talked about difficulties dating due to their weight/shape/size.....	☐	☐	☐	☐
24. Preferred to spend time alone because of their weight/shape/size.....	☐	☐	☐	☐
25. Participated in hobbies/clubs (e.g. church group, school club, 4-H, scouts).....	☐	☐	☐	☐
26. Found it difficult to find a job/volunteer activity because of their weight/shape/size.....	☐	☐	☐	☐
27. Worried about the future because of their weight/shape/size	☐	☐	☐	☐
28. Attended extracurricular school activities (e.g. dances, sporting events, clubs, concerts).....	☐	☐	☐	☐

Appendix H: Parenting Stress Index – Short Form

SA=Strongly **A**gree	**A**= **A**gree	**NS**=Not Sure	**D**=**D**isagree	**SD**=Strongly **D**isagree

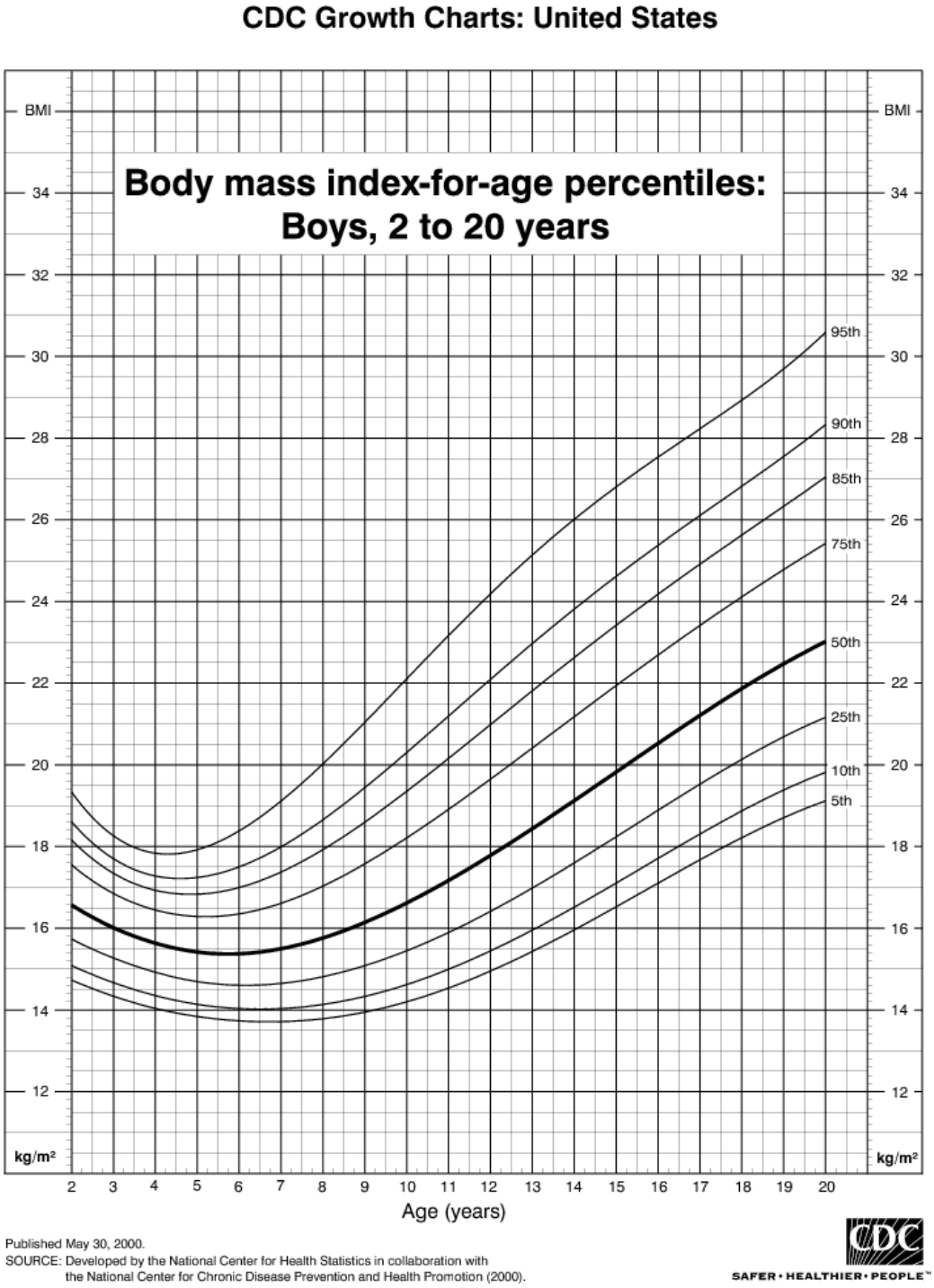
1. I often have the feeling that I cannot handle things very well.	SA	A	NS	D	SD
2. I find myself giving up more of my life to meet my child's needs than I ever expected.	SA	A	NS	D	SD
3. I feel trapped by my responsibilities as a parent.	SA	A	NS	D	SD
4. Since having this child, I have been unable to do new and different things I like to do.	SA	A	NS	D	SD
5. Since having a child, I feel that I am almost never able to do things that I like to do.	SA	A	NS	D	SD
6. I am unhappy with the last purchase of clothing I made for myself.	SA	A	NS	D	SD
7. There are quite a few things that bother me about my life.	SA	A	NS	D	SD
8. Having a child has caused me more problems than I expected in my relationship with my spouse (or male/female friend).	SA	A	NS	D	SD
9. I feel alone and without friends.	SA	A	NS	D	SD
10. When I go to a party, I usually expect not to enjoy myself.	SA	A	NS	D	SD
11. I am not as interested in people as I used to be.	SA	A	NS	D	SD
12. I don't enjoy things as I used to.	SA	A	NS	D	SD
	PD				
13. My child rarely does things for me that make me feel good.	SA	A	NS	D	SD
14. Sometimes I feel my child doesn't like me and doesn't want to be close to me.	SA	A	NS	D	SD
15. My child smiles at me much less than I expected.	SA	A	NS	D	SD
16. When I do things for my child, I get the feeling my efforts are not appreciated much.	SA	A	NS	D	SD
17. When playing, my child doesn't often giggle or laugh.	SA	A	NS	D	SD
18. My child doesn't seem to learn as quickly as most children.	SA	A	NS	D	SD
19. My child doesn't seem to smile as much as most children.	SA	A	NS	D	SD
20. My child is not able to do as much as I expected.	SA	A	NS	D	SD
21. It takes a long time and it is very hard for my child to get used to new things.	SA	A	NS	D	SD
22. For the next statement, choose your response from the choices "1" to "5" below. I feel I am: 1. not very good at being a parent 2. a person who has some trouble being a parent 3. an average parent 4. a better than average parent 5. a very good parent	1	2	3	4	5
23. I expected to have warmer feelings for my child than I do and this bothers me.	SA	A	NS	D	SD
24. Sometimes my child does things that bother me just to be mean.	SA	A	NS	D	SD
	P-CDI				

SA=Strongly **A**gree	**A**= **A**gree	**NS**=**N**ot Sure	**D**=**D**isagree	**SD**=Strongly **D**isagree

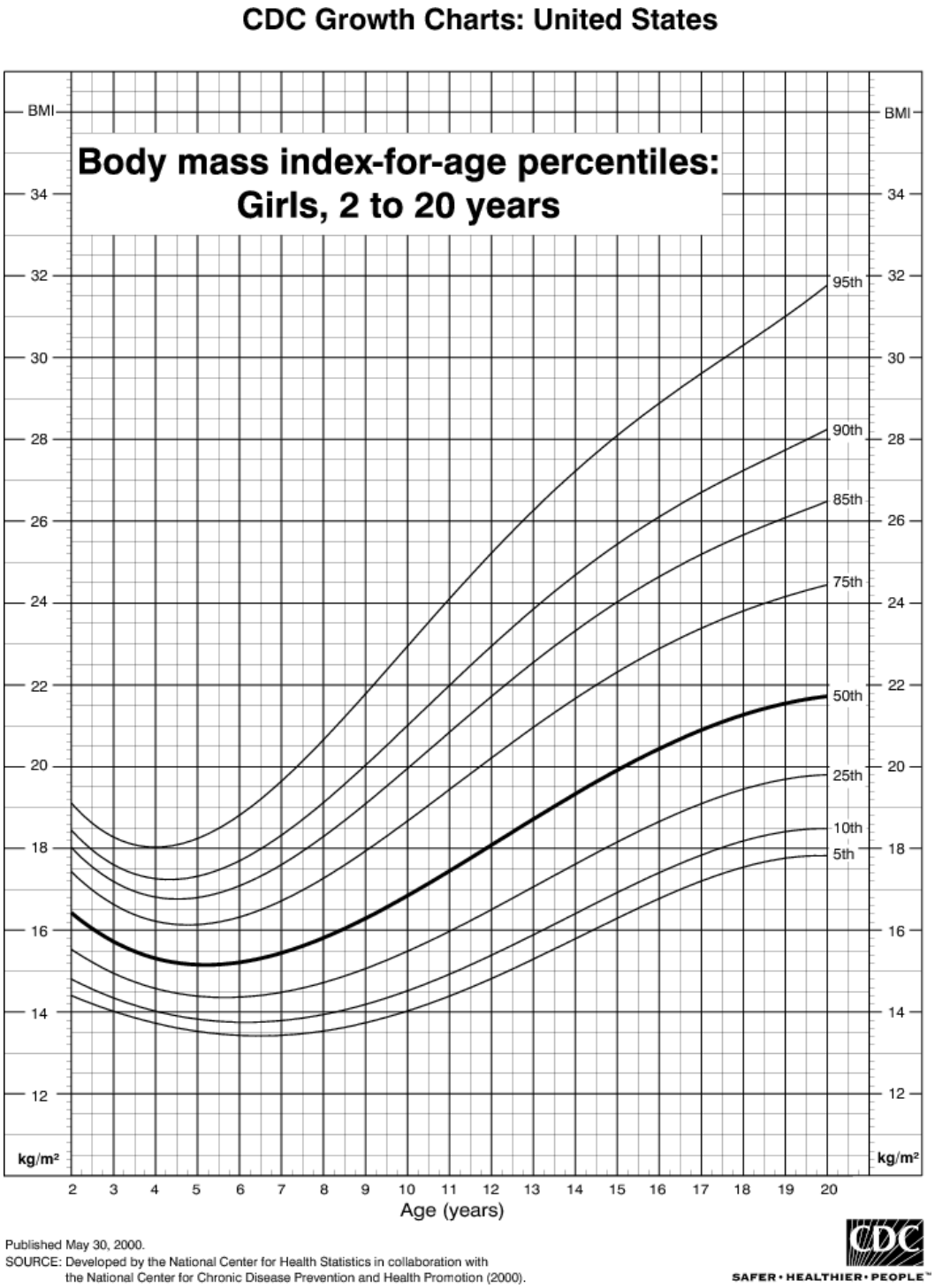
25. My child seems to cry or fuss more often than most children.	SA	A	NS	D	SD
26. My child generally wakes up in a bad mood.	SA	A	NS	D	SD
27. I feel that my child is very moody and easily upset.	SA	A	NS	D	SD
28. My child does a few things which bother me a great deal.	SA	A	NS	D	SD
29. My child reacts very strongly when something happens that my child doesn't like.	SA	A	NS	D	SD
30. My child gets upset easily over the smallest thing.	SA	A	NS	D	SD
31. My child's sleeping or eating schedule was much harder to establish than I expected.	SA	A	NS	D	SD
32. For the next statement, choose your response from the choices "1' to "5" below. I have found that getting my child to do something or stop doing something is: 1. much harder than I expected 2. somewhat harder than I expected 3. about as hard as I expected 4. somewhat easier than I expected 5. much easier than I expected	1	2	3	4	5
33. For the next statement, choose your response from the choices "10+" to "1-3" below. Think carefully and count the number of things which your child does that bother you. For example: dawdles, refuses to listen, overactive, cries, interrupts, fights, whines, etc. 1. 10+ 2. 8-9 3. 6-7 4. 4-5 5. 1-3	1	2	3	4	5
34. There are some things my child does that really bother me a lot.	SA	A	NS	D	SD
35. My child turned out to be more of a problem than I had expected.	SA	A	NS	D	SD
36. My child makes more demands on me than most children.	SA	A	NS	D	SD

DC	
Total Stress (Sum of PD, P-CDI, & DC)	

Appendix I: Body Mass Index Chart for Males



Appendix J: Body Mass Index Chart for Females



References

Abidin, R. R. (1990). *Parenting Stress Index-Manual (PSI) Short Form.* University of Virginia.

Achenbach, T. M., Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

Aggarwal, A. (2012). *Socioeconomic Disparities in Obesity Prevalence: Role of Diet Quality and Diet Cost.* US: ProQuest Information & Learning.

Akhtar-Danesh, N., Dehghan, M., Morrison, K. M., & Fonseka, S. (2011). Parents' perceptions and attitudes on childhood obesity: A Q-methodology study. Journal Of The American Academy Of Nurse Practitioners, 23(2), 67-75.

American Association of Diabetes Educators. (2011). Addressing Obesity via Diabetes Self-Management Education and Training. *The Diabetes Educator. 38(1),* 151-154.

Al-Akour, N. A., Khader, Y. S., Khassawneh, M. Y., & Bawadi, H. H. (2012). Health-related quality of life of adolescents with overweight or obesity in the north of Jordan. Child: Care, Health And Development, 38(2), 237-243.

Anderson, S. E., Cohen, P., Naumova, E. N., & Must, A. (2006). Association of Depression and Anxiety Disorders with Weight Change in a Prospective Community-Based Study of Children Followed Up into Adulthood. *Archive of Pediatric Medicine 160(3),* 285-291.

Anderson, S. E., Cohen, P., Naumova, E. N., Jacques, P. F., & Must, A. (2007). Adolescent obesity and risk for subsequent major depressive disorder and anxiety disorder: Prospective evidence. Psychosomatic Medicine, 69(8), 740-747.

Andersen, I., Heitman, B., Wagner, G. (2008). Obesity and Sexual Dysfunction in Younger Danish Men. *Journal of Sexual Medicine. 5(9),* 2053-2060.

Arbuckle, J. L. (2009). AMOS 17.0 User's Guide. *Amos Development,* Chicago: SPSS.

Baker J. P., Detsky A. S., Wesson D. E., Wolman S. L., Stewart S., Whitewell J. *et al*. (1982). A Comparison of Clinical Judgement and Objective Measurements. *New England Journal of Medicine, 4(22),* 969-972.

Beardslee, W. R., Versage, E. M., & Gladstone, T. R. (1998). Children of affectively ill parents: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1134–1141.

Bell-Ellison, B. A., (2009). Schools as Moderators of Neighborhood Influences on Adolescent Academic Achievement and Risk of Obesity: A Cross-Classified Multilevel Investigation. *Dissertation Abstracts International. 69(8A),* 3349.

Beydoun, M. A., Wang, Y. (2010). Pathways linking **socioeconomic** status to **obesity** through depression and lifestyle factors among young US adults. *Journal of Affective Disorders. 123(1),* 52-63.

Blaine, B. (2008). Does Depression Cause Obesity? *Journal of Health Psychology, 13(8),* 1190-1197.

Boutelle, K., Hannan, P., Fulkerson, J., Crow, S. (2010). Obesity as a Prospective Predictor of Depression in Adolescent Females. *Health Psychology, 29,* 293-298.

Braet, C., & Van Strien, T. (1997). Assessment of emotional, externally induced and restrained eating behaviour in nine to twelve-year-old obese and non-obese children. Behaviour Research And Therapy, 35(9), 863-873.

Britz, B., Siegfried, W., Ziegler, A., Lamertz, C., Herpertz-Dahlmann, B. M., Remschmidt, H., et al. (2000). Rates of psychiatric disorders in a clinical study group of adolescents with extreme obesity and in obese adolescents ascertained via a population based study. *International Journal of Obesity, 24*, 1707–1414.

Bruch, H. (1941). Obesity in childhood and personality development. *American Journal of Orthopsychiatry, 11*, 467–475.

Bullen, B. A., Monello, L. F., Cohen, H., Mayor J. (1963). Attitudes Toward Physical Activity, Food, and Family in Obese and Non-Obese Adolescent Girls. *American Journal of Clinical Nutrition. 12,* 1-11.

Bullinger, M. (2002). Assessing health related quality of life in medicine. An overview over concepts, methods and applications in international research. Restorative Neurology And Neuroscience, 20(3-4), 93-101.

Burke, L. (2003). The impact of maternal depression on familial relationships. *International Review of Psychiatry, 15*, 243–255.

Cameron, A. J., Magliano, D. J., Dunstan, D. W., Zimmet, P. Z., Hesketh, K. K., Peeters, A. A., & Shaw, J. E. (2012). A bi-directional relationship between obesity and health-related quality of life: Evidence from the longitudinal AusDiab study. International Journal Of Obesity, 36(2), 295-303.

Caskey, S. R., & Felker, D. W. (1971). Social stereotyping of female body image by elementary school age girls. Research Quarterly, 42(3), 251-255.Center for Disease Control and Prevention. (9/13/2012). Healthy Weight: It's not a Diet It's a Lifestyle. In Center for Disease Control and Prevention. Retrieved 8/5/2012, from

http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html/#What is BMI percentile.

Center For Disease Control. (May 6, 2006). Body Mass Index (BMI) Percentiles for Boys, 2 to 20 Years. In Body Mass Index (BMI) Percentiles for Girls, 2 to 20 Years. Retrieved May 21, 2013, from http://www.chartsgraphsdiagrams.com/HealthCharts/bmi-percentiles-boys.html.

Center For Disease Control. (May 6, 2006). Body Mass Index (BMI) Percentiles for Girls, 2 to 20 Years. In Body Mass Index (BMI) Percentiles for Girls, 2 to 20 Years. Retrieved May 21, 2013, from http://www.chartsgraphsdiagrams.com/HealthCharts/bmi-percentiles-girls.html.

Chaput, J., & Tremblay, A. (2006). Obesity at an Early Age and Its Impact on Child Development. *Encyclopedia on Early Childhood Development.*

Chiou HH, Hsieh LP. (2008). Parenting stress in parents of children with epilepsy and asthma. J Child Neurol. 23:301–306.

Clarke, G., DeBar, L., & Yarborough, B. (2011). Primary prevention of secondary depression: Indirect prevention of depression in girls by treating or preventing primary obesity or insomnia. In T. J. Strauman, P. R. Costanzo, J. Garber (Eds.) , Depression in adolescent girls: Science and prevention (pp. 235-274). New York, NY US: Guilford Press.

Cline, G., Schwartz, D. D., Axelrad, M. E., & Anderson, B. (2011). A pilot study of acute stress symptoms in parents and youth following diagnosis of type I diabetes.Journal Of Clinical Psychology In Medical Settings, 18(4), 416-422.

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences (2nd ed.). New Jersey: Lawrence Erlbaum.

Cushner-Weinstein S, Dassoulas K, Salpekar JA, et al. (2008). Parenting stress and childhood epilepsy: the impact of depression, learning, and seizure-related factors. Epilepsy Behav. 13: 109–114.

Davison, K.K., & Birch, L.L. (2001). Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics, 107*(1), 46-53.

Davis, C. L., Tomporowski, P. D., McDowell, J. E., Austin, B. P., Miller, P. H., Yanasak, N. E., & Naglieri, J. A. (2011). Exercise improves executive function and achievement and alters brain activation in overweight children: A randomized, controlled trial. Health Psychology, 30(1), 91-98.

Desai, M. D., & Patoliya, H. M. (2011). Impact of body weight and perception of overall body image on depression among post-graduate female students. Indian Journal Of Community Psychology, 7(2), 341-346.

Dey, M., Landolt, M. A., Mohler,-Kuo, M. (2013). Assessing Parent-Child Agreement in Health-Related Quality of Life among Three Health Status Groups. *Social Psychiatry and Psychiatric Epideiology*, 48(3), 503-511.

Durand, E. F., Logan, C., Carruth, A. (2007). Association of Maternal Obesity and Childhood Obesity: Implications for Healthcare Providers. Journal of Community Health Nursing. 24(3), 167-176.

Efrat, M. (2011). The relationship between low-income and minority children's physical activity and academic-related outcomes: A review of the literature. Health Education & Behavior, 38(5), 441-451.

Epstein LH, Paluch RA, Roemmich JN. (2007). Family-based obesity treatment, then and now: twenty-five years of pediatric obesity treatment. *Health Psychology*, 26, 381–391.

Epstein, L. H., Paluch, R. C., Gordy, C. C., Saelens, B. E., & Ernst, M. M. (2000). Problem solving in the treatment of childhood obesity. *Health Psychology, 68,* 717–721.

Epstein, L. H., Myers, M. D., & Anderson, K. (1996). The association of maternal psychopathology and family socioeconomic status with psychological problems in obese children. *Obesity, 4*, 65–74.

Epstein, L. H., Klein, K. R., & Wisniewski, L. (1994). Child and parent factors that influence psychological problems in obese children. *International Journal of Eating Disorders, 15,* 151–158.

Epstein, L. H., Wisniewski, L., & Weng, R. (1994). Child and parent psychological problems influence child weight control. *Obesity, 2*, 509–515.

Erermis, S., Cetin, N., Tamar, M., Bukusoglu, N., Akdeniz, F., & Goksen, D. (2004). Is obesity a risk factor for psychopathology among adolescents? *Pediatrics International*, *46*, 296–301.

Erhart, M., & Ravens-Sieberer, U. (2006). Health-related quality of life instruments and individual diagnosis--A new area of application. GMS Psycho-Social-Medicine,31-13.

Fallon, E. M., Tanofsky-Kraff, M., Norman, A. C., McDuffie, J. R., Taylor, E. D., Cohen, M. L., et al. (2005). Health-related quality of life in overweight and nonoverweight black and white adolescents. *Journal of Pediatrics, 147*, 443–450.

Faul, F., (2009). G*Power Version 3.1.2. University of Kiel, Germany.

Fernandez, M., Sturm, R. (2010). Facility provision in elementary schools: Correlates with physical education, recess, and obesity. Preventative Medicine: An International Journal Devoted to Practice and Theory. 50, 30-35.

Field, A. E., Camargo, C. r., Taylor, C., Berkey, C. S., Frazier, L., Gillman, M. W., & Colditz, G. A. (1999). Overweight, weight concerns, and bulimic behaviors among girls and boys. Journal Of The American Academy Of Child & Adolescent Psychiatry, 38(6), 754-760.

Field, A. E., & Kitos, N. R. (2009). Social and interpersonal influences on obesity in youth: Family, peers, society. In L. J. Heinberg, J. Thompson (Eds.) , Obesity in youth: Causes, consequences, and cures (pp. 59-76). Washington, DC US: American Psychological Association. doi:10.1037/11868-003

Finch, A. J., Saylor, C., Edwards, G., McIntosh, J. (1987). Children's Depression Inventory: Reliability over Repeated Administrations. Journal of Clinical Child Psychology. 16(4), 339-341.

Forbes, G. B., Halloran, E. (1976). The Adult Decline in Lean Body Mass. Human Biology. 21(1), 79-82.

Friedlander, S. L., Larkin, E. K., Rosen, C. L., Palermo, T. M., & Redline, S. (2003). Decreased quality of life associated with obesity in school-aged children. *Archives of Pediatric and Adolescent Medicine, 157*, 1206–1211.

Fryback, D. G. (2010). Measuring Health Related Quality of Life. Workshop on Advancing Social Science Theory: The Importance of Common Metrics The National Academies, Division of Behavioral and Social Sciences and Education Washington, D.C., February, 2010.

Fryback DG, Dunham NC, Palta M, Hanmer J, Buechner J, Cherepanov D, Herrington SA, Hays RD, Kaplan RM, Ganiats TG, Feeny D and Kind P. US Norms for Six Generic Health-Related Quality-of-Life Indexes From the National Health Measurement Study. Med Care 2007; 45(12) 1162-1170.

Fryback DG, Lawrence WF, Martin PA, Klein R and Klein BEK. Predicting quality of well-being scores from the SF-36: Results from the Beaver Dam Health Outcomes Study. Medical Decision Making 1997; 17(1) 1-9.

Fuemmeler, B. F., Baffi, C., Masse, L. C., Atienza, A. A., Evans, W. D. (2007). Employer and Healthcare Policy Interventions Aimed at Adult Obesity. American Journal of Preventative Medicine. 32(1). 44-51.

Fuxa, A. J., & Fulkerson, J. A. (2011). Adolescent obesity and school performance and perceptions of the school environment among Minnesota high school students. School Mental Health, 3(2), 102-110.

Gable, S., Krull, J. L., & Srikanta, A. (2008). Childhood overweight and academic achievement. In H. E. Fitzgerald, V. Mousouli, H. Davies (Eds.) , Obesity in childhood and adolescence, Vol 2: Understanding development and prevention (pp. 49-71). Westport, CT US: Praeger Publishers/Greenwood Publishing Group.

Gearhardt, A. N., Bragg, M. A., Pearl, R. L., Schvey, N. A., Roberto, C. A., Brownell, K. D. (2012). Obesity and Public Policy. Clinical Psychology. 8, 405-430.

Goodman, E., & Whitaker, R. (2002). A Prospective Study on the Role of Depression in the Development Persistence of Adolescent Obesity. Pediatrics, 110, 497-504.

Graham, J. W. (2009). Missing Data Analysis: Making it Work in the Real World. *Annual Review of Psychology, 60,* 549-576.

Grilo, C., Masheb, R., Wilson, G., Gueorguieva, R., White, M. (2011). Cognitive-Behavioral Therapy, Behavioral Weight Loss, and Sequential Treatment for Obese Patients with Binge Eating Disorder: A Randomized Controlled Trial. Journal of Consulting and Clinical Psychology, 79, 675-685.

Grunstein, R., Stenlof, K., Hedner, J., Peltonen, M., Karason, K., Sjostrom, L. (2007). Two Year Reduction in Sleep Apnea Symptoms and Associated Diabetes Incidence after Weight Loss in Severe Obesity. Sleep: Journal of Sleep and Sleep Disorders Research. 30(6). 703-710.

Guilfoyle, S. M., Zeller, M. H., Modi, A. C. (2010). Parenting Stress Impacts Obesity-Specific Health-RelatedQuality of Life in a Pediatric Obesity Treatment-Seeking Sample. Journal of Developmental and Behavioral Pediatrics. 31, 17-25.

Haraldstad, K., Christophersen, K., Eide, H., Nativg, G. K., & Helseth, S. (2011). Predictors of health-related quality of life in a sample of children and adolescents: A school survey. Journal Of Clinical Nursing, 20(21-22), 3048-3056.

Harris, M. B., Harris, R. J., & Bochner, S. (1982). Fat, four-eyed, and female: Stereotypes of obesity, glasses, and gender. Journal Of Applied Social Psychology,12(6), 503-516.

Harris, M. B., Smith, S. D. (1983). The Relationship of Age, Sex, Ethnicity, and Weight to Stereotypes of Obesity and Self-Perception. International Journal of Obesity. 7, 361-371.

Haskett, M., Ahern, L., Ward, C., Allaire, J. (2006). Factor Structure and Validity of the Parenting Stress Index-Short Form. Journal Of Clinical Child And Adolescent Psychology. 35(2):302-312.

Hays, R. D., Brodsky, M., Johnston, M., Spritzer, K. L., & Hui, K. (2005). Evaluating the statistical significance of health-related quality-of-life change in individual patients. Evaluation & The Health Professions, 28(2), 160-171.

Helgeson, V. S., Becker, D., Escobar, O., & Siminerio, L. (2012). Families with children with diabetes: Implications of parent stress for parent and child health. Journal Of Pediatric Psychology, 37(4), 467-478.

Heo, M., Pietrobelli, A., Wang, D., Heymsfield, S., Faith, M. (2010). Obesity and Functional Impairment: Influence of Comorbidity, Joint Pain, and Mental Health. Obesity. 18(10), 2030-2038.

Herzer, M., Zeller, M., Rausch, J., Modi, A. (2011). Perceived Social Support and Its Association With Obesity-Specific Health-Related Quality of Life. Journal of Developmental and Behavioral Pediatrics, 32, 188-195.

Hill, A. J., Draper, E., Stack, J. (1994). A Weight on Children's Minds: Body Shape Dissatisfaction at 9-Years-Old. International Journal of Obesity. 18, 383-389.

Hilliard, M. E., Monaghan, M. M., Cogen, F. R., & Streisand, R. R. (2011). Parent stress and child behaviour among young children with type 1 diabetes. Child: Care, Health And Development, 37(2), 224-232.

Hillman, J.B., Dorn, L. D., & Huang, B. (2010). Association of Anxiety and Depressive Symptoms and Adiposity among Adolescent Females, using Dual Energy X-ray Absorptiometry. Clinical Pediatrics 49(7), 671-677.

Hofer, S. (2000). *Multiple Imputation in Multivariate Research.* Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Howard, J. S., Mattacola, C. G., Howell, D. M., & Lattermann, C. (2011). Response shift theory: An application for health-related quality of life in rehabilitation research and practice. Journal Of Allied Health, 40(1), 31-38.

Hu, H., Wu, C., Chou, Y., Huang, N. (2012). Body Mass Index and Mental Health Problems in General Adults: Disparity in Gender and Socioeconomic Status. Jounal of Psychosomatic Research. 72(5), 393-398.

Isnard, P., Michel, G., Frelut, M. L., Vila, G., Falissard, B., Naja, W., et al. (2003). Binge eating and psychopathology in severely obese adolescents. *International Journal of Eating Disorders, 34*, 235–243.

Ivarsson, T., Svalander, P., Litlere, O. (2006). The Children's Depression Inventory (CDI) as Measure of Depression in Swedish Adolescents. A Normative Study. Nord Journal of Psychiatry. 60(3), 220-226.

Jaime, P. C., Lock, K. (2008). Do School Based Food and Nutrition Policies Improve Diet and Reduce Obesity? Preventative Medicine. 48(1). 45-53.

Jarvie, G. J., Lahey, B. B., Graziano, W., & Framer, E. (1983). Childhood obesity and social stigma: What we know and what we don't know. Developmental Review,3(3), 237-273.

Jebb, S., Wells, J. (2008). Measuring Body Composition in Children and Adults. *Clinical Obesity in Adults and Children.* 12-28.

Jelalian, E., & Steele, R. G. (2008). Handbook of childhood and adolescent obesity. New York, NY US: Springer Science + Business Media.

Kasasbeh, A., Kasasbeh, E., Krishnaswamy, G. (2012). Potential Mechanisms Connecting Asthma, Esophageal Reflux, and Obesity/Sleep Apnea Complex: A Hypothetical Review. Sleep Medicine. 11(1), 47-58.

Keating, C. L., Moodie, M. L., & Swinburn, B. A. (2011). The health-related quality of life of overweight and obese adolescents—A study measuring body mass index and adolescent-reported perceptions. International Journal Of Pediatric Obesity, 6(5-6), 434-441.

Kheirandish-Gozal, L., Gozal, D. (2012). Obesity, Asthma, and Sleep-Disordered Breathing. The Journal of Pediatrics. 160(5). 713-714.

Keith, T., Z. (2006). Multiple Regression and Beyond. Boston, Pearson Education Inc.

Kline, R. (2005). Principles and Practice of Structural Equation Modeling: Second Edition. Guilford Press.

Knight, R. G. (1984). Some general population norms for the short form Beck Depression Inventory. Journal Of Clinical Psychology, 40(3), 751-753.

Koball, A. M., & Carels, R. A. (2011). Coping responses as mediators in the relationship between perceived weight stigma and depression. Eating And Weight Disorders, 16(1), e17-e23.

Kolotkin, R. L., Zeller, M., Modi, A. C., Samsa, G. P., Polanichka Quinlan, N., Yanovski, J. A., et al. (2006). Assessing weight-related quality of life in adolescents. *Obesity, 14*, 448–457.

Kopelman, P. G., Caterson, I. D., Dietz, W. H. (2008). Clinical Obesity in Adults and Children. Blackwell Publishing.

Kovacs, M. (1982). Children's Depression Inventory. Multi-Health Systems.

Kovacs, M. (1992). *Children's depression inventory*. North Tonawanda, NY: Multi-Health Systems.

Kreze, A., Zelina, M., Juhas, J., Garbara, M. (1974). Relationship between Intelligence and Prevalence of Obesity. Human Biology. 46(1), 109-113.

Kristeller, J., Hallet, B. (1999). An Exploratory Study of Meditation-Based Intervention for Binge Eating Disorder, Journal of Health Psychology, 4, 357-363.

Lachal, J., Speranza, M., Taïeb, O., Falissard, B., Lefèvre, H., Moro, M., & Revah-Levy, A. (2012). Qualitative research using photo-elicitation to explore the role of food in family relationships among obese adolescents. Appetite, 58(3), 1099-1105.

Lamertz, C. M., Jacobi, C., Yassouridis, A., Arnold, K., & Henkel, A. W. (2002). Are obese adolescents and young adults at higher risk for mental disorders? A community survey. *Obesity, 10*, 1152–1160.

Landgraf, J., Abetz, L., & Ware, J. E. (1996). *Child Health Questionnaire (CHQ): A user's manual*. Boston: The Health Institute, New England Medical Center.

Levesque, R., (2007). Programming and Data Management for SPSS Statistics 17.0. Chicago: SPSS Inc.

Lillis, J., Levin, M. E., & Hayes, S. C. (2011). Exploring the relationship between body mass index and health-related quality of life: A pilot study of the impact of weight self-stigma and experiential avoidance. Journal Of Health Psychology, 16(5), 722-727.

Maitra, S. K., Payne, C. M. E. (2004). The obesity syndrome and acanthosis nigricans. Acanthosis nigricans is a common cosmetic problem providing epidemiological clues to the obesity syndrome, the insulin-resistance syndrome, the thrifty metabolism, dyslipidaemia, hypertension and diabetes mellitus type II. Journal of Cosmetic Dermatology. 3, 202-210.

Matsuo, T., Sairenchi, T., Suzuki, K., Tanaka, K., Muto, T. (2011). Long-Term Stable Obesity Increases Risk of Hypertension. International Journal of Obesity. 35, 1056-1062.

Matsuzawa, Y. (2010). Obesity as an Endocrine Disease. Clinical Obesity in Children and Adults. 200-207.

McCabe, M., Ricciardelli, L. (2003). Body image strategies to lose weight and increase muscle among boys and girls. Health Psychology, 22(1) 39-46.

Mehlenbeck, R. S., & Wember, Y. (2008). Motivational interviewing and pediatric obesity. In E. Jelalian, R. G. Steele (Eds.) , Handbook of childhood and adolescent obesity (pp. 405-424). New York, NY US: Springer Science + Business Media.Mitchell, N. S., Catenacci, V. A.

Mertler, C. A. & Vannatta, R. A. (2005). *Advanced and Multivariate Statistical Methods* (3rd Edition). Los Angeles, CA: Pyrczak Publishing.

Mezulis, A. H., Funasaki, K., Charbonneau, A., Hyde, J. (2010). Gender Differences in the Cognitive Vulnerability-Stress Model of Depression in the Transition to Adolescence. *Cognitive Therapy and Research.* 34(6), 501-513.

Michel, G., Bisegger, C., Fuhr, D. C., & Abel, T. (2009). Age and gender differences in health-related quality of life of children and adolescents in Europe: A multilevel analysis. Quality Of Life Research: An International Journal Of Quality Of Life Aspects Of Treatment, Care & Rehabilitation, 18(9), 1147-1157.

Modi, A. C., Zeller, M. H. (2009). Sizing Me Up Manual. Cincinnati Children's Hospital Medical Center.

Modi, A. C., Zeller, M. H. (2008). Sizing Them Up Manual. Cincinnati Children's Hospital Medical Center.

Modi, A. C., Zeller, M. H. (2008). Validation of a Parent-Proxy, Obesity-Specific Quality-of-Life Measure: Sizing Them Up. Obesity. 16, 2624-2633.

Modi, A., Loux, T., Bell, S., Harmon, C., Inge, T., Zeller, M. (2008). Weight-Specific Health-Related Quality of Life in Adolescents With Extreme Obesity. Obesity, 16, 2266-2271.

Mond, J., Baune, B. (2009). Overweight, Medical Comorbidity, and Health-Related Quality of Life in a Community Sample of Men and Women. Obesity, 17, 1627-1634.

Moore, L. C., Harris, C. V., & Bradlyn, A. S. (2012). Exploring the relationship between parental concern and the management of childhood obesity. Maternal And Child Health Journal, 16(4), 902-908.

Mullins LL, Wolfe-Christensen C, Pai AL, et al. (2007). The relationship of parental overprotection, perceived child vulnerability, and parenting stress to uncertainty in youth with chronic illness. J Pediatr Psychol. 32:973–982.

Must, A., & Strauss, R.S. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal Of Obesity And Related Metabolic Disorders: Journal Of The International Association For The Study Of Obesity, 23 Suppl 2*, S2-11.

Mustillo, S., Worthman, C., Erkanli, A., Keeler, G., Angold, A., Costello, E. J., (2003). Obesity and Psychiatric Disorders: Developmental Trajectories. Pediatrics. 111, 851-859.

Nadeau, K., Kolotkin, R., Boex, R., Witten, T., McFann, K., Zeiter, P., Walders-Abramson, N. (2011). Health-Related Quality of Life in Adolescents With Comorbidities Related to Obesity. Journal of Adolescent Health, 49, 90-92.

Nanney, M. S., Nelson, T., Wall, M., Haddad, T., Kubik, M., Laska, M. N., Story, M. (2010). State School Nutrition and Physical Activity Policy Environments and Youth Obesity. American Journal of Preventive Medicine. 38(1), 9-16.

Neumark-Sztainer, D. D., Falkner, N. N., Story, M. M., Perry, C. C., Hannan, P. J., & Mulert, S. S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. International Journal Of Obesity, 26(1), 123-131.

New York State Department of Health. (July 2011). What Complications (Problems) are Caused by Diabetes?. In Information for a Healthy New York. Retrieved August 14, 2012, from http://www.health.ny.gov/diseases/conditions/diabetes/problems_caused_by_diabetes.htm.

Norgan N. G. (1994). Interpretation of Low Body Mass Indices: Australian Aborigines. American Journal of Physical Anthropology 94(2), 229-237.

Norgan N. G. (1994). Body Mass Index and Nutritional Status: the Effects of Adjusting Body Mass Index for the Relative Sitting Height on Estimates of the Prevalence of Chronic Energy Deficiency, Overweight and Obesity. Asian and Pacific Studies (Suppl).

Ohleyer, V., Freddo, M., Bagner, D. M., et al. (2007). Disease-related stress in parents of children who are overweight: relations with parental anxiety and childhood psychosocial functioning. J Child Health Care.11:132–142.

O'Neil, M. E., Shewokis, P. A., Falkenstein, K. K., DeLago, C. W., Smith, S. A., Vaughn, N. A., & Costigan, T. E. (2010). Psychosocial factors and health perceptions in parents and children who are overweight or obese. Obesity, 18(8), 1558-1565.

Pine, D. S., Goldstein, R. B., Wolk, S., & Weissman, M. M. (2001). The association between childhood depression and adulthood body mass index. *Pediatrics, 107*, 1049–1056.

Pinkney, J. (2008). Obesity and Disease: Hormones and Obesity. *Clinical Obesity in Adults and Children.* 198-212.

Proietto, J. (2008). Obesity and Disease: Insulin Resistance, Diabetes, Metabolic Syndrome, and Polycystic Ovary Syndrome. *Clinical Obesity in Adults and Children.*184-197.

Puhl, R. M., Henderson, K. E., Brownell, K. D. (2008). Social Consequences of Obesity. *Clinical Obesity in Adults and Children*. 28-45.

Puder, J., Munsch, S. (2010). Psychological Correlates of Childhood Obesity, International Journal of Obesity, 34, 537-543.

Quittner, A. L., Davis, M. A., & Modi, A. C. (2003). Health-related quality of life in pediatric populations. In M. Roberts (Ed.), *Handbook of pediatric psychology* (pp. 696–709). New York: Guilford Publications.

Ravens-Sieberer, U., & Bullinger, M. (1998). Assessing health-related quality of life in chronically ill children with the German KINDL: First psychometric and content analytical results. *Quality of Life Research, 7*, 399–407.

Ravens-Sieberer, U., Redegeld, M., & Bullinger, M. (2001). Quality of life after in-patient rehabilitation in children with obesity. *International Journal of Obesity and Related Metabolic Disorders, 25*, S63–S65.

Reddy, V. (1991). Body Mass Index and Mortality Rates. Nutrition News. 12. National Institute of Nutrition, Hyderabad.

Renouf, A. G., & Kovacs, M. (1994). Concordance between mothers' reports and children's self-reports of depressive symptoms: A longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*, 208–216.

Renzaho, A., Wooden, M., & Houng, B. (2010). Associations between body mass index and health-related quality of life among Australian adults. Quality Of Life Research: An International Journal Of Quality Of Life Aspects Of Treatment, Care & Rehabilitation, 19(4), 515-520.

Revicki, D. A., Osoba, D., Fairclough, D., Barofsky, I., Berzon, R., Leidy, N. K., et al. (2000). Recommendations on health-related quality of life research to support labeling and promotional claims in the United States. *Quality of Life Research, 9*, 887–900.

Richardson, L. P., Davis, R., Poulton, R., McCauley, E., Moffitt, T. E., Caspi, A., et al. (2003). A longitudinal evaluation of adolescent depression and adult obesity. *Archives of Pediatric and Adolescent Medicine, 157,* 739–745.

Rief, W., Glaesmer, H., Baehr, V., Broadbent, E., Brähler, E., & Petrie, K. J. (2012). The relationship of modern health worries to depression, symptom reporting and quality of life in a general population survey. Journal of Psychosomatic Research, 72(4), 318-320.

Riis, J., Grason, H., Strobino, D., Ahmed, S., Minkovitz, C. (2012). State School Policies and Youth Obesity. Maternal and Child Health Journal. 16(1). 111-118.

Ridder, D., Wit, J., Adriaanse, M. (2009). Making Plans for Healthy Diet: The Role of Motivation and Action Orientation. European Journal of Social Psychology, 39, 622-630.

Rocchini, A. P. (2011). Childhood Obesity and Coronary Heart Disease. The New England Journal of Medicine. 365(20). 1927-1929.

Roemmich, J. N., Smith, J. R., Epstein, L. H., & Lambiase, M. (2007). Stress reactivity and adiposity of youth. Obesity, 15(9), 2303-2310.

Sajobi, T., Lix, L., Clara, I., Walker, J., Graff, L., Rawsthorne, P., Miller, N., Rogala, L., Carr, R., Bernstein, C. (2012). Measures of Relative Importance for Health-Related Quality of Life. Quality of Life Research, 21, 1-11.

Sallade, J. (1973). A comparison of the psychological adjustment of obese vs. non-obese children. Journal Of Psychosomatic Research, 17(2), 89-96.

Sanger, M. S., MacLean, W. E., & Van Slyke, D. A. (1992). Relation between maternal characteristics and child behavior ratings. Implications for interpreting behavior checklists. *Clinical Pediatrics, 31,* 461–466.

Sarwer, D., Dilks, R. (2011). Invited Commentary: Childhood and Adolescent Obesity: Psychological and Behavioral Issues in Weight Loss Treatment. Journal of Youth and Adolescenc, 41, 98-104.

Schipper, H., Clinch, J. J., & Olweny, C. L. (1996). Quality of life studies: Definitions and conceptual issues. In B. Spilker (Ed.), *Quality of life and pharmacoeconomics in clinical trials* (2nd ed., pp. 11–23). Philadelphia: Lippincott-Raven.

Schulz, S. S., & Laessle, R. G. (2012). Stress-induced laboratory eating behavior in obese women with binge eating disorder. Appetite, 58(2), 457-461.

Schwimmer, J. B., Burwinkle, T. M., & Varni, J. W. (2003). Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association, 289*, 1813–1819.

Seidell, J. (2008). Epidemiology – Definition and Classification of Obesity. *Clinical Obesity in Adults and Children.* 3-11.

Sorensen, T. I., Sonne-Holm, S. (1985). Intelligence Test Performance in Obesity in Relation to Educational Attainment and Parent Social Class. Journal of Biosocial Science. 17(4), 379-387.

Soderland, L., Nordqvist, C., Angbratt, M., Nilsen, P. (2009). Applying Motivational Interviewing to Counseling Overweight and Obese Children, Health Education Research, 24, 442-449.

Spollett, G. R. (2012). Insulin initiation in type 2 diabetes: What are the treatment regimen options and how can we best help patients feel empowered? Journal of the American Academy of Nurse Practitioners. 24(1), 249-259.

Steiger, J. H., (1980). Tests for Comparing Elements of a Correlation Matrix. Psychological Bulletin, 87(2), 245-251.

Steinbeck, K. (2008). Childhood Obesity: Consequences and Physical and Psychosocial Complications. *Clinical Obesity in Adults and Children.* 231-248.

Streisand, R., Kazak, A. E., Tercyak, K. P. (2003). Pediatric-specific parenting stress and family functioning in parents of children treated for cancer. Child Health Care. 32:245–256.

Stern, M., Mazzeo, S. E., Gerke, C. K., Porter, J. S., Bean, M. K., & Laver, J. H. (2007). Gender, ethnicity, psychosocial factors, and quality of life among severely overweight, treatment-seeking adolescents. *Journal of Pediatric Psychology, 32*, 90–94.

Strine, T. W., Chapman, D. P., Balluz, L., & Mokdad, A. H. (2008). Health-related quality of life and health behaviors by social and emotional support: Their relevance to psychiatry and medicine. Social Psychiatry And Psychiatric Epidemiology, 43(2), 151-159.

Swallen, K. C., Reither, E. N., Haas, S. A., & Meier, A. M. (2005). Overweight, obesity, and health-related quality of life among adolescents: The National Longitudinal Study of Adolescent Health. *Pediatrics, 115*, 340–347.

Tan, S., & Rey, J. (2005). Depression in the young, parental depression and parenting stress. Australasian Psychiatry, 13(1), 76-79.

Tanofsky-Kraff, M., Yanovski, S. Z., Wilfley, D. E., Marmarosh, C., Morgan, C. M., & Yanovski, J. A. (2004). Eating-disordered behaviors, body fat, and psychopathology in overweight and normal-weight children. *Journal of Consulting and Clinical Psychology, 72*, 53–61.

Telford, R. D., Cunningham, R. B., Fitzgerald, R., Olive, L. S., Prosser, L., Jiang, X., Telford, R. M. (2012). Physical Education, Obesity, and Academic Achievement: A 2-Year Longitudinal Investigation of Australian Elementary School Children. Research and Practice. 102(2). 368-374.

Tiggemann, M., & Rothblum, E. D. (1988). Gender differences in social consequences of perceived overweight in the United States and Australia. Sex Roles, 18(1-2), 75-86.

Ullmann, S., Buttenheim, A.M., Goldman, N., Pebley, A. R., Wong, R. (2011). Socioeconomic Differences in Obesity among Mexican Adolescents. International Journal of Pediatric Obesity, 6(2), 373-380.

United States Department of Health and Human Services. (2001). *The Surgeon General's Call to Action To Prevent and Decrease Overweight and Obesity 2001*. Public Health Service, Office of the Surgeon General. Rockville, MD.

Valtolina, G. G., & Marta, E. (1998). Family relations and psychosocial risk in families with an obese adolescent. Psychological Reports, 83(1), 251-260.

Varni, J. W., Seid, M., & Kurtin, P. S. (2001). PedsQL 4.0: Reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. *Medical Care, 39,* 800–812.

Ventura AK, Birch LL. (2008). Does parenting affect children's eating and weight status? *Int J Behav Nutr Phys Ac*, 5(15).

Von Lengerke, T., John, J., Mielck, A. (2010). Excess direct medical costs of severe obesity by socioeconomic status in German adults. GMS Psycho-Social-Medicine. 7, 2-20.

Wake, M., Salmon, L., Waters, E., Wright, M., & Hesketh, K. (2002). Parent-reported health status of overweight and obese Australian primary school children: A crosssectional population survey. *International Journal of Obesity and Related Metabolic Disorders, 26*, 717–724.

Washington, G. (2008). Mind over matter: Treating depression to fight childhood obesity and type II diabetes. Journal Of Child And Adolescent Psychiatric Nursing,21(1)

Wei, S., Schmidt, M., Dwyer, T., Norman, R. Venn, A. (2009). Obesity and Menstrual Irregularity: Associations with SHBG, Testosterone, and Insulin. Obesity. 17(5). 1070-1076.

Wilcox, I. (2010). Cardiovascular Consequences of Obesity.

Wiley-Blackwell, Ipswich, MA. Williams, J. W., Canterford, L., Hesketh, K. D., Hardy, P., Waters, E. B., Patton, G. C., & Wake, M. (2011). Changes in body mass index and health related quality of life from childhood to adolescence. International Journal Of Pediatric Obesity, 6(2-2), e442-e448.

Williams, J., Wake, M., Hesketh, K., Maher, E., & Waters, E. (2005). Health-related quality of life of overweight and obese children. *Journal of the American Medical Association, 293*, 70–76.

Wothke, W. (2000). Longitudinal and Multigroup Modeling with Missing Data. In T. D. Little, K. U. Schnabel & J. Baumart (Eds.), *Modeling Longitudinal and Multi-Group Data: Practical Issues, Applied Approaches, and Specific Examples.* (pp. 219-240). Mahwah, NJ: Lawrence Erlbaum Publishers.

Wyatt, H. R., Hill, J. O. (2011). Obesity: Overview of an Epidemic. Pediatric Clinics of North America. 34(4).

Young-Hyman, D., Schlundt, D. G., Herman-Wenderoth, L., & Bozylinski, K. (2003). Obesity, appearance, and psychosocial adaptation in young African American children. *Journal of Pediatric Psychology, 28*, 463–472.

Zeller, M., Modi, A. (2009). Development and Initial Validation of an Obesity-Specific Health-Related Quality-of-Life Measure for Children: Sizing Me Up. Obesity, 17, 1171-1177.

Zeller, M., Modi, A. (2008). Psychosocial Factors Related to Obesity in Children and Adolescents. Handbook of clinical child psychology (2nd ed.) [e-book]. Oxford England: John Wiley & Sons; 1992: 25-42.

Zeller, M. H., & Modi, A. C. (2006). Predictors of health-related quality of life in obese youth. *Obesity, 14*, 122–130.

Zeller, M. H., Roehrig, H. R., Modi, A. C., Daniels, S. R., & Inge, T. H. (2006). Health Related quality of life and depressive symptoms in adolescents with extreme obesity presenting for bariatric surgery. *Pediatrics, 117*, 1155–1161.

Zeller, M. H., Saelens, B. E., Roehrig, H., Kirk, S., & Daniels, S. (2004). Psychological adjustment of obese youth presenting for weight management treatment. *Obesity, 12*, 1576–1586.

Zeller, M. H., Kirk, S., Claytor, R., Khoury, P., Grieme, J., Santangelo, M., et al. (2004). Predictors of attrition from a pediatric weight management program. *Journal of Pediatrics, 144*, 466–470.

Zeller, M. H., Reiter-Purtill, J., Modi, A. C., Gutzwiller, J., Vannatta, K., & Davies, W. H. (2007). A controlled study of critical parent and family factors in the obesigenic environment. *Obesity*, *15*,126–136.

VITA

Joshua Craig Rainey received his high school diploma in 2003, and immediately enrolled in Drury University. He earned a Bachelor of Arts in Psychology, Criminology, and Sociology from Drury University in 2007, and was awarded the Victor Agruso Behavioral Science Award. In the same year he enrolled in the University of Texas at Austin's School Psychology Doctoral Program. Josh earned the degree of Master of Arts in 2011. He will complete his pre-doctoral internship at Indiana University Health Ball Memorial Hospital in Muncie, Indiana in August 2014. Josh is expected to earn his doctorate in the summer of 2014.

Email: joshcraigrainey@gmail.com

This manuscript was typed by the author.